Final Report

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Sponsoring Agency: U.S. Environmental Protection Agency
Project: Economic Impact of Mountain Top Mining and Valley Fills Environmental Impact Statement
Contractor: Hill & Associates, Inc.
OMB Clearance No. for Progress Reports: 2030-0005

Date: December 12, 2001

I. Background

This work was performed to provide assistance required by the U.S. EPA Region III to support the development of a Programmatic Environmental Impact Statement to assess the impacts of mountaintop mining and valley fill practices in sub-regions of West Virginia, eastern Kentucky and Virginia, as defined by the EIS Steering Committee.

In December 1998, Federal agencies and environmentalists agreed to a partial settlement of a lawsuit by the West Virginia Highlands Conservancy and several coal field residents against the WV Department of Environmental Protection (WVDEP) and the U.S. Army Corps of Engineers. Under the agreement, the EPA, the Office of Surface Mining, the Corps of Engineers, and the U.S. Fish and Wildlife Service, in conjunction with WVDEP, agreed to develop a Programmatic Environmental Impact Statement to assess the impacts of mountaintop mining and valley fill (MTM/VF) practices in Appalachian coal fields and to evaluate a range of changes to regulatory requirements and practices.

This work is part of a three-phase study to evaluate the economic impacts of regulatory changes for the mining industry. Phase 1 examines the impact of proposed regulatory changes on the amount of mineable coal reserves. Phase 2 uses these results to estimate the market impacts on coal prices, coal production, electricity generation and electricity pricing. Phase 3 addresses the total direct and indirect impact on the economies of the three eastern states included in the study.

Work on Phase 1, under a separate EPA contract, was performed by Resources Technology Corporation (RTC) of State College, Pennsylvania, to calculate coal reserves in West Virginia and the impacts of any regulatory restrictions on the amount of coal mineable with mountaintop mining and valley fill techniques. After completion of their West Virginia analysis, RTC extended their effort to include the coal reserves in eastern Kentucky and in Virginia and above-drainage reserves outside of mountaintop mineable sites. The portion of RTC's results which pertained to mountaintop ***mining*** sites became input to the effort by Hill & Associates, Inc. (H&A) of Annapolis, Maryland, which is the

subject of this Final Report for the Phase 2 work. H&A analyzed the implications of those regulatory restrictions on the markets for coal mined in West Virginia, eastern Kentucky and Virginia, as well as the implications on coal and electricity prices.

II. Methodology

In this study, H&A used its proprietary database of coal mine operations and costs, its integrated Coal Forecasting System and National Power Model, data produced by RTC as described above, and its professional expertise in coal and energy markets to conduct the analysis of regulatory impacts on the selected coal markets and energy prices. H&A produced a baseline forecast with its models for each year in the period 2001-2010. This same time period then was again forecasted for each scenario of potential MTM/VF regulation. It is important to note that this current work includes the impacts of only one variable, the restriction of valley fill watershed size. Any other potential changes to the economics of surface mining in the study area are not included in this study.

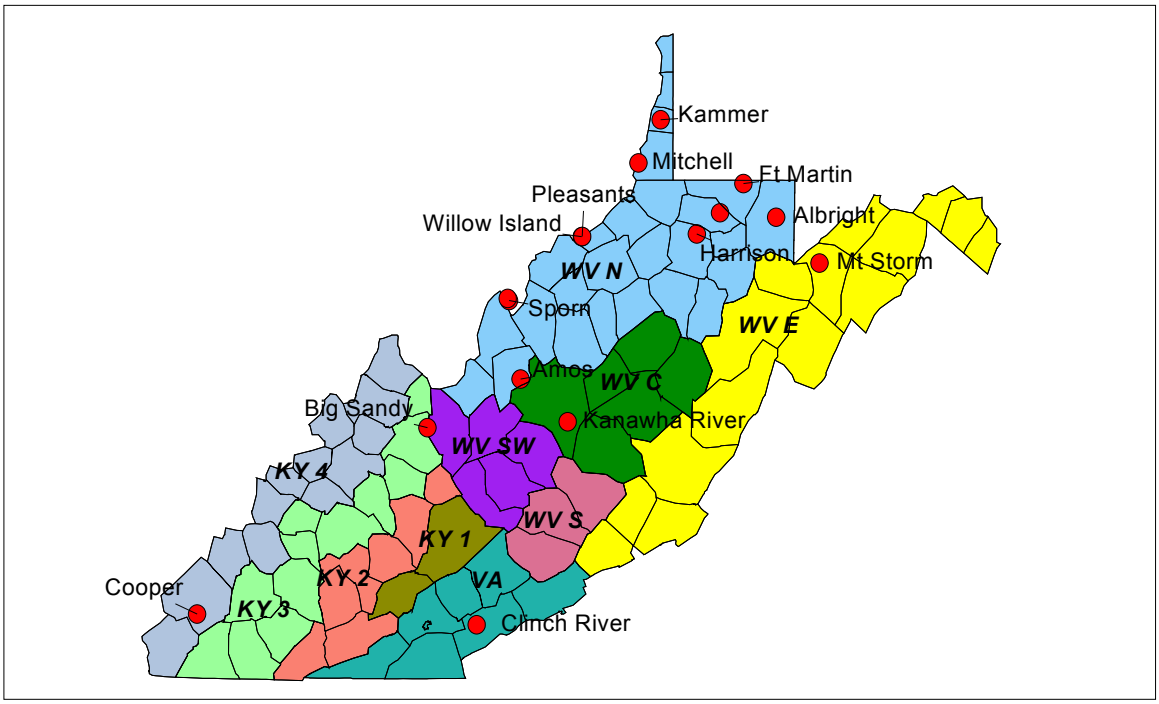
II.A. Assumptions

The baseline forecast was under an assumption of pre-lawsuit status quo with regard to Central Appalachian mining regulations. However, changes in utility plant air emission regulations were allowed to occur according to the scenario approved by the EIS Steering Committee. These changes include the implementation of National Ambient Air Quality Standards for ground-level ozone and for fine particulate matter. Specifically, the modeling assumed the following post-1998 structure of air emission environmental regulation of electric power plants:

- Title IV Phase II SO_2 and NO_x standards starting in 2000
- EPA 19-state (formerly 22-state before court relief granted for MO, WI and GA) NO_x SIP Call effective in 2005 (assuming further delay beyond 2004)
- NAAQS fine particulate standards represented as 50% reduction in SO_2 from Phase II levels beginning in 2008
- No CO_2 limits during the time frame of this study

Holding this year-by-year pattern of air emission regulations consistently the same across mining scenarios, H&A conducted an assessment, across four alternate mining regulatory scenarios, of changes from the base case in supply conditions in five mining sub-regions of West Virginia, four sub-regions of eastern Kentucky, and one region representing Virginia. Those sub-regions are shown in the figure below:

Figure 1 – Sub-Regions of the Study (With Power Plants)



The four alternate scenarios in addition to the Base Case are:

- Limiting valley fills to 250 acres watershed size
- Limiting valley fills to 150 acres watershed size
- Limiting valley fills to 75 acres watershed size
- Limiting valley fills to 35 acres watershed size

Using the supply changes provided by RTC from Phase 1, H&A then modeled the coal and electricity market implications of the four alternate regulatory scenarios using its integrated Coal Forecasting System and National Power Model.

RTC provided H&A with a database, which contained an estimate of recoverable coal reserves for each potential mountaintop removal site in West Virginia. In situations where a given site was mineable across a county boundary, the amount of coal in each county was calculated separately. RTC also provided an estimate of how much these reserves would be reduced for each of the four restricted mining scenarios.

In order to apply these numbers from RTC to H&A's existing database of coal production, reserves and mining costs, we calculated the percentage reduction for each mining case on a county by county basis. We then adjusted the reserves and production figures in our supply database downward by the same percentages, on a county by county basis in West Virginia. H&A did not interview individual coal producers to ascertain their estimates of reserve reductions on specific properties. The following table shows

the calculated reduction percentages by West Virginia county. It shows the remaining fraction of each county's surface reserves after portions are rendered unmineable by the proposed MTM/VF restrictions.

Table 1 – West Virginia County Reduction Impact

		Remaining Fraction of Surface Reserves (Not Rendered Unmineable by MTM/VF)			
COUNTY	STATE	250 Acre	150 Acre	75 Acre	35 Acre
BARBOUR	WV	1.000	1.000	1.000	1.000
BOONE	WV	0.995	0.922	0.703	0.277
BRAXTON	WV	1.000	1.000	1.000	1.000
CLAY	WV	1.000	1.000	1.000	0.602
FAYETTE	WV	1.000	1.000	1.000	0.118
GREENBRIER	WV	1.000	1.000	1.000	1.000
KANAWHA	WV	0.913	0.913	0.415	0.119
LINCOLN	WV	0.128	0.128	0.111	0.075
LOGAN	WV	0.766	0.554	0.272	0.088
MCDOWELL	WV	1.000	1.000	0.850	0.360
MERCER	WV	1.000	1.000	1.000	1.000
MINGO	WV	0.786	0.781	0.505	0.218
NICHOLAS	WV	0.994	0.976	0.801	0.390
POCAHONTAS	WV	1.000	1.000	1.000	1.000
RALEIGH	WV	0.380	0.380	0.380	0.182
RANDOLPH	WV	1.000	1.000	1.000	1.000
SUMMERS	WV	1.000	1.000	1.000	1.000
UPSHUR	WV	1.000	1.000	1.000	1.000
WAYNE	WV	0.332	0.332	0.332	0.247
WEBSTER	WV	1.000	1.000	1.000	0.797
WYOMING	WV	0.633	0.663	0.633	0.073

For the purpose of this study, it was assumed that deep-mineable coal reserves were not affected by the hypothetical mining restrictions. However, in practice, deep mines in the study region typically feed raw production to a preparation plant for cleaning, and the reject material is often deposited in a nearby valley. The EIS Steering Committee instructed that coal refuse disposal associated with deep mining is not a part of this study.

RTC did not have the same detailed mapping capability in Kentucky and Virginia as it did in West Virginia. Therefore, RTC compared the topography in the coal producing counties of those states to the counties in West Virginia and supplied H&A with a table of comparable counties. H&A used these comparisons and made the same production/reserve reductions for counties with similar slope characteristics. The

following table shows the coal producing counties in Virginia and Kentucky and the counties in West Virginia with similar topographic characteristics.

Table 2 – Similar Eastern Kentucky and Virginia Counties

County	State	Similar WV County
Bell	KY	Braxton
Breathitt	KY	Webster
Clay	KY	Wayne
Dickenson	VA	Webster
Floyd	KY	Clay
Harlan	KY	McDowell
Jackson	KY	Raleigh
Johnson	KY	Wayne
Knott	KY	Boone
Knox	KY	Fayette
Laurel	KY	Raleigh
Lawrence	KY	Wayne
Lee	KY	Raleigh
Leslie	KY	Boone
Letcher	KY	McDowell
Magoffin	KY	Kanawha
Martin	KY	Lincoln
McCreary	KY	Raleigh
Morgan	KY	Wayne
Owsley	KY	Nicholas
Perry	KY	Clay
Pike	KY	Mingo
Pulaski	KY	Raleigh
Rockcastle	KY	Fayette
Whitely	KY	Raleigh
Buchanan	VA	Boone
Lee	VA	Raleigh
Russell	VA	Nicholas
Scott	VA	Fayette
Tazewell	VA	Nicholas
Wise	VA	Nicholas

At the sites where RTC determined that mountaintop mining would not be feasible in the four restricted cases, RTC also calculated the tonnage of coal reserves that could be recovered by three other methods including: continuous-miner deep mine, contour strip, auger/highwall miner. These reserves were "added back" to the supply database as possible new mines. The hypothetical opening of these mines was delayed two years to account for engineering and permitting.

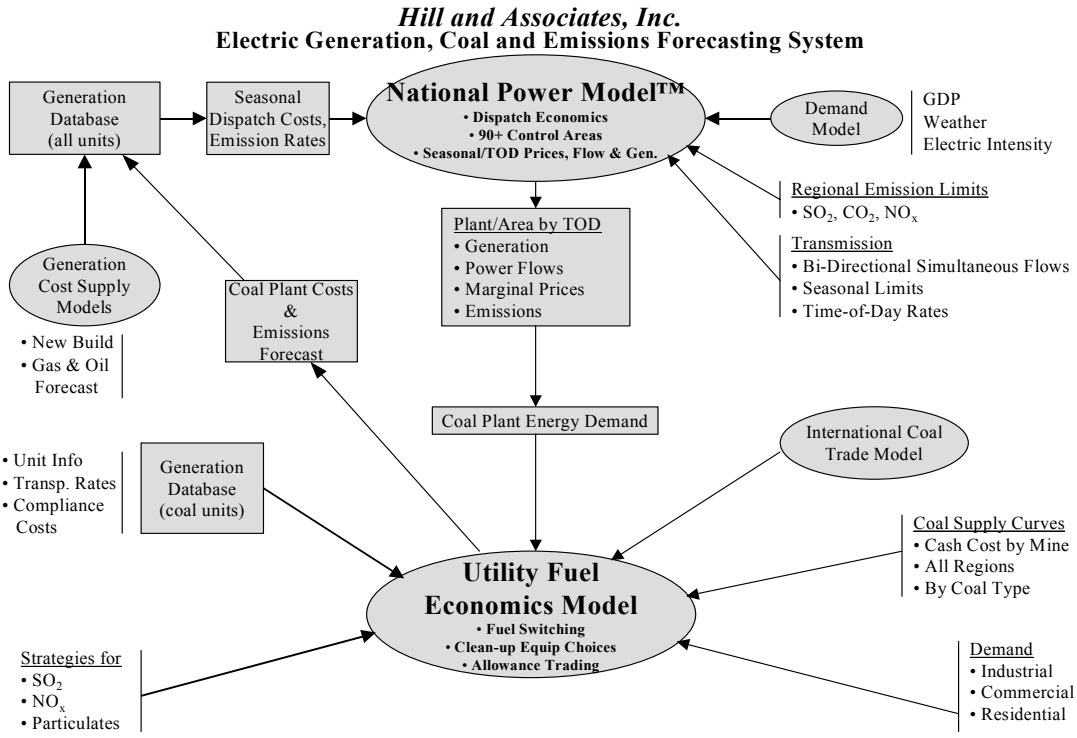
The mining cash operating costs on a per ton basis for active mines in our original database were held constant as the production and reserve values were reduced for each scenario. For the reserves that could be recovered by other methods, we assigned the average costs for active mines for each type of mining in each county.

In order to compare mining regulatory scenarios on both a risk-adjusted basis as well as an unadjusted basis, H&A ran two separate versions of the Base Case. One Base Case version used a "standard" 10% Return on Investment (ROI) criterion for investment in new coal mining capacity, while the other Base Case version used the same 15% ROI criterion that the MTM/VF regulation-affected scenarios used to reflect higher capital investment risk under a more aggressive regulatory environment.

II.B. The Models

The flow diagram in Figure 2 summarizes the actual modeling system that H&A uses to develop coal demand, supply and price projections, along with the electricity generation and electricity pricing associated with these coal projections.

Figure 2



This system is a combination of two primary models, the Utility Fuel Economics Model (UFEM) and the National Power Model (NPM). The UFEM determines optimal fuel choices as well as optimal environmental clean-up equipment selection at each utility coal-fired plant in the nation, while the NPM determines optimal dispatch of all electric generating plants (both coal and non-coal) on the electric grid.

By looping back and forth between these two models in a circular fashion for each year under a specific set of environmental rules, an overall converged optimization is reached in which the fuel and clean-up choices at each coal plant are dependent, in part, upon the plant's amount of dispatch while that dispatch is simultaneously determined, in part, by the costs and emissions from those fuel-related choices. The primary usefulness of this modeling approach for this current project lies in the fact that all U.S. plants are considered simultaneously in competition with each other both for their coal supply and for their competitive dispatch on the electric grid. The summation of individual plant fuel demands results in a total of coal demand for each specific region's coal.

Additionally, since we have each plant's most likely decision on the installation of environmental clean-up equipment (and have used an estimate of the costs associated with installing and operating such equipment in obtaining that likely decision), the final converged optimization result contains the plant-by-plant building blocks from which we can sum each sub-region's total of capital expenditures by utilities for environmental clean-up equipment. Those totals by sub-region are reported by year as results from this study.

During specific runs of the modeling system, as the National Power Model dispatches all the plants in the U.S. simultaneously by time-of-day and season, the coal-fired plants are competing against each other and against other generating plants such as gas-fired, nuclear, hydro, etc. Depending upon which environmental limits are in effect in each area of the country for the year being modeled, more or less power will be required from individual coal-fired plants, and these requirements are then translated into specific types of coal demand in the Utility Fuel Economics Model. The aggregated total tonnages for each coal type then become the basis for that scenario's coal forecast. To this electric utility basis are added independent projections of industrial steam coal use and exports of steam coal. The resultant totals by coal type determine the market clearing price for each coal as prices "float" against each other from their respective cost-supply curves.

II.C. Mining Cost-Supply Curves

Inside the UFEM model, the supply curves relating mining costs to production capacity were built up from mine-by-mine estimates of cash operating costs for all currently operating mines in the country. The cash operating costs used in the model's supply curves are defined as including the following components: labor, materials and supplies, trucking to the prep plant or load-out, preparation costs (including loading), Black Lung/Reclamation taxes, mine overhead charge, division overhead charge, pension contribution, property tax, severance tax, and royalties.

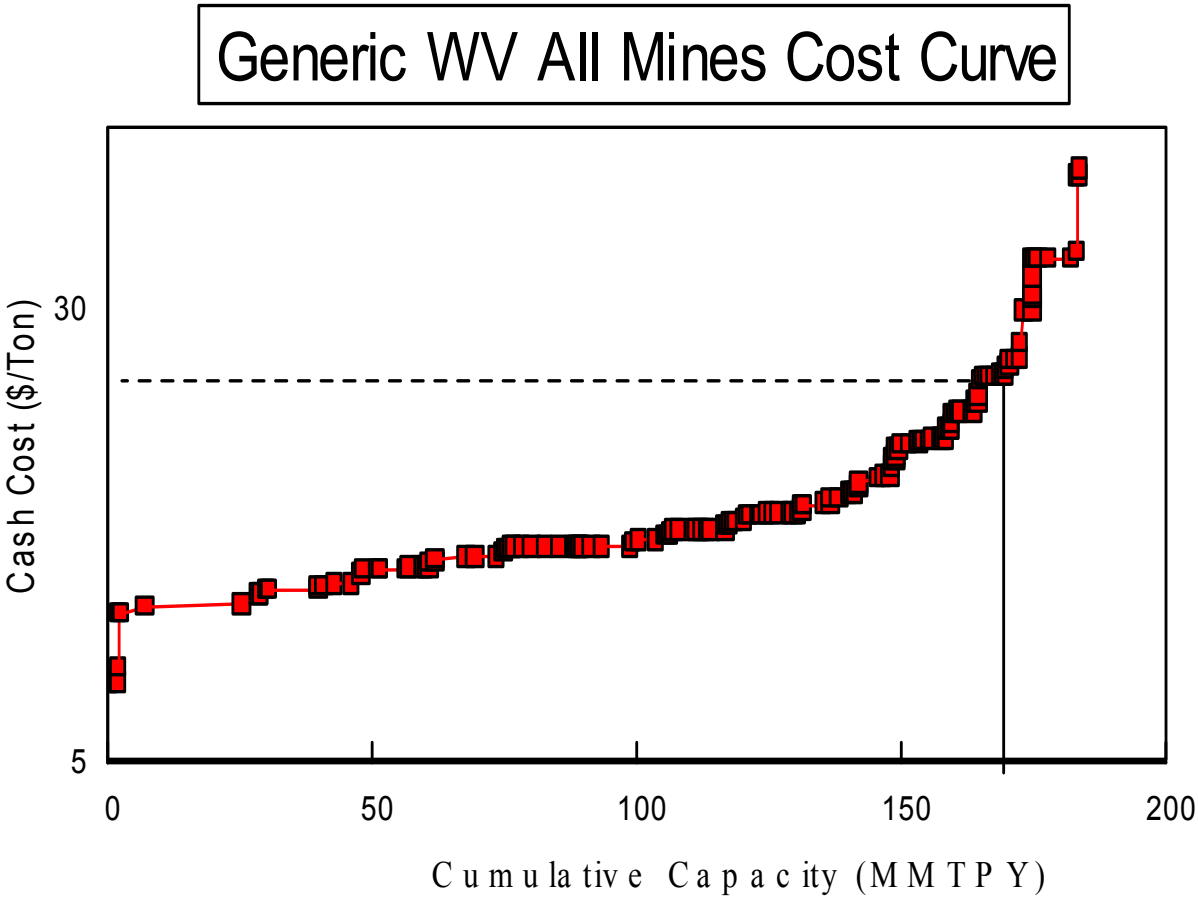
Much of the information on costs, qualities and reserves was taken from the detailed county-by-county studies of coal supply that Hill & Associates, Inc. has been publishing for more than 15 years. Within our proprietary database, costs for all active mines were estimated by entering mine specific data into computer models developed by Hill & Associates. MSHA databases provided information on active mines, production, employees and manhours worked, from which we calculated productivity. This base was

supplemented with information from mine interviews concerning work schedules, equipment, percentage of washed coal and trucking distances. In instances where trucking distances were not obtained by interviews, the distance was measured between the mine and the preparation plant via the most logical road using a computer-mapping program. Costs for potential mines on undeveloped properties were estimated by looking at costs of comparable active operations located nearby.

In the current version of the UFEM model, we have more than 100 separate sub-types of coal including 12 in West Virginia, 9 in eastern Kentucky and 5 in Virginia. For example, southern West Virginia mid-Btu near-compliance coal originating on the CSX railroad is a unique coal type with its own cost-supply curve separate from that same coal originating on the Norfolk Southern railroad.

Although Hill & Associates considers their individual mining cost curves (by specific type of coal) to be highly proprietary, we include in Figure 3 below a composite generalized curve for West Virginia for purposes of understanding in this report. The figure will be referenced in the methodology discussion that follows.

Figure 3



Each step on each mining cost-supply curve represents one mine with its own individual characteristics. It is this fact that allows us to incorporate the results of Phase 1 of the overall EIS study (the work by Resources Technology Corporation) into the H&A modeling system to differentiate between the separate MTM/VF regulatory scenarios. In particular, although RTC's results are not property-specific, the relative amount of coal made unmineable (or shifted to a higher-cost mining technique with less recovery) in each county under each MTM/VF scenario can be reduced to a percentage impact for that county.

Since we know the location of each mine and its characteristics, we can take each surface mine in a county and apply the county's percentage reduction impact to that mine's capacity and reserves (including, where appropriate, adding back a smaller higher-cost step into the mining cost-supply curve from which that mine was taken if the MTM/VF reduction could partially be replaced with another type of mining). Spreading the county's aggregated reduction percentage across all surface mines in the county does not exactly match what would happen in the real world where a true mountain top mining project might be more heavily affected while a small contour mining operation might escape totally unaffected. However, for the purposes of determining coal price and tonnage impacts on multi-county sub-regions of the affected states, it is believed that this methodology provides virtually identical results to what would be obtained if we had exact property-specific match-ups from Phase 1 of the overall EIS study. Although modeling, by its nature, establishes some industry-typical behavior patterns and decision rules, we would expect in the real world that some mines would be better prepared than others to adapt to any new regulations.

It is important to note that both the current production capacity and the reserves were reduced in this study by the appropriate county's reduction percentage. This implies a *de facto* assumption that any MTM/VF restrictions would be applied with no "grandfather" provisions exempting existing operations. In other words, existing operations that would violate the scenario's interpretation of MTM/VF rules would have their production capacity (in the modeling) immediately reduced, as well as having their reserves reduced for supporting future production. A methodology of reducing only reserves and leaving existing capacity intact (effectively grandfathering existing operations) could have been used, but one methodology or the other was required to be chosen for a single study, and the EIS Steering Committee chose the one equally affecting both reserves and existing capacity. The real world impact of the mining restrictions during the first year might be muted somewhat, compared to our modeling results, due to the fact that some operations have established fills and pre-stripped some amount of overburden for future mining.

The mine-by-mine nature of the steps on the model's mining cost curves serves a second purpose in this project. After the converged optimization is achieved between the UFEM and NPM models for any given year for a specific scenario, the final total amount of coal taken from each supply curve is used to determine which steps (or individual mines) produced coal in that model run, and which did not. As an output function, then, the supply curves are "broken apart" after the run, and the mines actually producing are

summed by their type of mining (surface versus deep) and their sub-region of location. Thus, the tonnage results included later in this report are obtained by this summation (across several cost-supply curves) of the mines from a particular sub-region that actually produced coal in that year's model run for that scenario.

Since each coal type represented by a mining cost-supply curve has its own final market clearing price after the model run is done, a weighted average price calculation can be performed for each sub-region's coal production during the summation procedure described above. It is important to note that the modeling approach used in this study yields short-term market clearing prices for new business at the margin, and it does not include any averaging into the results of older long-term contracts which may be "out of market."

In addition, since we know the very specific type of mining such as longwall mining or continuous miner sections for each step (or individual mine) on the cost-supply curve, we can use our knowledge of typical manning tables for each type of mine to estimate the direct coal mining employment in each sub-region during the summation process described above for mines that actually operated during the model convergence runs. Future manning levels at coal mines were estimated by using the active production and productivity rates as reported by MSHA for surface and deep mines in the study area. The total number of production employees at active surface and deep mines was divided by the actual tonnage produced to determine ratios. These were then used as multipliers and were applied to the tons of production that were predicted by the model for the future years.

The values shown in the tables represent production employees only and do not include prep plant and mine office personnel. On the average, surface mines increase employment by 3.9 percent for the non-production tasks, including mine office staff, prep plant and "yard workers." For deep mines, the average is 10.5 percent. The overall average is 8.2 percent for deep and surface mining. In addition, some state labor statistics for "coal industry employment" include non-mining personnel involved in transportation, marketing and support services. None of these categories are included in the direct production employees reported in the results of this study.

II.D. Electricity Input/Output

On the electricity side, the NPM model works in a similar fashion with electric dispatch cost curves instead of mining cost curves. However, while the UFEM's mining cost curves stay relatively static during the modeling of any one year in a scenario (they do change across years as described later), the NPM's dispatch cost curves are very fluid during one year's looping between the models, changing with each loop as the coal-fired plants enter the electricity model with sometimes significantly different costs and emission rates due to their fuel and clean-up choices in each loop. Figure 1 above shows not only the sub-region definitions, but also the major coal-fired utility plants within each region. The electricity outputs from the NPM model include not only the megawatt-hours from coal-fired plants, but also the generation from all generators in the sub-region.

Wholesale electricity prices reported as output from the NPM model are really the "lambda" costs for each control area (basically, each utility) in the model. This lambda cost is defined as the dispatch cost of the very last plant that dispatched (i.e. the highest-cost plant that actually ran in that time-of-day period) within that control area. If the highest-cost power actually used for that time period happens to be wheeled power imported from a neighboring utility, then that cost of imported power is the lambda cost reported out as "wholesale electricity price" for that time-of-day and season for that control area.

Since the study sub-regions were defined around coal production, it turns out that some of them have no generating facilities in the sub-region. For this reason, some sub-regions will show electricity "results" in later sections of this report that stay uniformly at zero. Obviously, there still exists a price for electricity for those regions (although not a megawatt-hours of production number). However, we opt to report the "raw" weighted averages of electricity price from generators for the Phase 2 results, leaving it to the expertise of Phase 3 modelers to impute an electricity price from surrounding areas for those that show zero.

II.E. New Capacity Additions

Finally, we turn now to the methodology by which new capacity, both for coal mining and for electric generation, is added in the modeling. With regard to coal productive capacity, each cost step on the mining cost-supply curves has a "tons per year" new capacity number associated with it, as well as an amount of "additional" reserves that are associated with that new capacity (where that new capacity would be based on newly developed reserves). For many lower-cost steps, one or the other of these amounts (or both) have a zero value in the model because we believe that no new capacity can be built at that cost level or no new reserves are available to be developed at that level.

The real meaning behind those "new" mining capacity numbers (and associated reserves, in some cases) is important. In a few instances, this new capacity is actually associated with the specific mine whose cash operating cost was the basis for building that step into the curve. For those instances, our estimate is that the particular mine in question has the appropriate coal reserves available and the ability to expand their production at the same cost level at which they are now operating.

More often, this new capacity is not associated with that mine but rather represents the "step-out" capacity (at a cost increase) for another mine that is lower on the cost-supply curve. In other words, the lower-cost existing mine may have the opportunity to purchase or lease adjacent reserves that are not as geologically favorable for economic mining as those of their existing operation (or the step-out reserves may require longer haulage to a preparation plant at increased cost, for example). For this reason, the mining cost-supply curve has this higher cost step with zero initial capacity, but non-zero latent expansion capacity, lying "on top of" the step for the other, higher-cost existing mine which just

happens to have the same cash operating cost as would be incurred with these other reserves.

In the UFEM model, the market clearing price for any coal is determined by the relationship between the final converged demand for that coal and the cost-supply curve for that coal. Referring to Figure 3 above, this is demonstrated by the vertical solid line (representing a hypothetical 170 million ton demand against the "generic WV all mines cost curve") which intersects the curve and generates the horizontal dotted line that goes to the left and hits the Y-axis at a "market clearing" coal price of something under $30 per ton.

This market clearing price is reported from the model as the coal's price except in instances where there is extreme shortage of the coal in question. If the competitive balance point for demand is so large compared to available capacity that it is effectively beyond the right-hand edge of the cost curve, then there is no "intersection" of demand with the curve. In that case, the reported price is set at a "net-back" value representing the highest value that some potential purchaser would actually be willing to pay (if more of that coal were available) in order to avoid some other costs such as installing a scrubber or purchasing another coal at high delivered cost. A real-world example of this netback phenomenon occurred in mid-2001 when Powder River Basin coal, whose cash operating cost does not exceed, say, $4.00 per ton, was selling in the marketplace for $12.00-$14.00 per ton. The coal was truly "worth" that to some buyers who could avoid paying $50.00 per ton for eastern coal in the very tight market.

For any point (or mine) on the curve to the left of the solid vertical "demand" line in Figure 3, the vertical distance down from the dotted line to the point (or mine) measures the cash "margin" that is available to that mine at that market clearing price. (We avoid the word "profit" here since the capital investment in the original mine is being ignored, and we are dealing only with cash operating costs.) For instance, referring to Figure 3 above, the mines falling between 160 and 170 mmtpy on the X-axis are just barely below the dotted line and may be making a cash "margin" of only $1-$2 per ton to cover their capital investment plus true profit. On the other hand, all of the mines below, say, 100 mmtpy will be experiencing a cash "margin" of several times that amount. For any particular mine, this larger cash "margin" may not only cover capital recovery (depending on the investment cost in that mine), but may be generating a Return on Investment (ROI) in excess of 10%. It is important to remember that Figure 3 is an illustrative generic curve and that the actual curves used in the modeling are much more definitive by type of coal instead of simply "all WV."

Now all of the pieces start coming together with regard to the addition of new capacity into the mining cost curves. During the running of the UFEM model for any given year in a scenario, a check is made of this cash "margin" for every point on every curve. When the margin is sufficient to meet or exceed the criterion ROI for the expansion capital investment in that particular scenario, then that step's latent "new capacity" is brought into the curve at that specific cost level, effectively expanding the horizontal span, or capacity, of that step.

However, the model imposes an overriding limit in each area (the "Area Limit") to avoid the situation where a price spike could trigger more capacity investment (in the model) than could be realistically accommodated in the real world. The model starts at the lower end of the curve (where cash "margin" is the greatest for any equilibrium price) and brings on the economically justified new capacity additions until the overriding "Area Limit" is reached. After that point, cost steps are not allowed to expand (in this particular year), even though the criterion ROI would be exceeded for that mine to expand. It is important to note that the overriding limit frequently is not reached even with fairly high prices because there is little expansion capability at the lower cost levels on the left side of the curve – Most of the undeveloped capacity occurs at higher cost levels.

In the modeling, we assumed that the initial year in which valley fill restrictions are first imposed (2002 in these scenarios) would be a "regrouping" year in which coal producers would concentrate on adjusting to the new rules at their existing operations and would not invest in ROI-driven capacity expansion for new operations inside the study area. Our primary rationale was that producers would take a "wait and see" attitude to let things "settle down" under new rules before they replaced their lost capacity. A secondary rationale was that at least a portion of any new replacement capacity would need to go through the design, engineering, permitting and construction procurement process, and all of this takes time.

One additional wrinkle in the methodology reflects the fact that there exists a very real "lag time" between the perceived need for new capacity investment and the point in time where that capacity is actually available. That lag time may be on the order of 1-3 years, but is somewhat offset by anticipation among the producer community (i.e. plans and permits may be preliminarily started with an eye toward rising prices). For this reason, the model uses a one-year delay in bringing on new capacity. In other words, the cash "margin" test described above actually uses the equilibrium price from last year's converged solution to bring on the new capacity instead of the price emerging out of this year's solution.

The bottom line is that, in the model, there is a "balancing act" occurring which mirrors what happens in the real world. In this balancing act, any "shortening" of a mine curve (due to exhaustion of reserves at individual mines, for example, or due to MTM/VF reductions to capacity) will likely lead to somewhat higher prices as demand hits "higher" on a shorter curve. These higher prices, in turn, cause more steps on the cost curve to "see" an acceptable ROI, leading to capacity expansion for that step if any is available. The concept of this "balancing act" is important to understanding some of the results presented later in this report.

There are two other secondary methods by which capacity is added into the mine curves within the model. First, one of the inputs to the model is an assumption of future productivity growth for each of the more than 100 types of coal. In these runs, a productivity gain of 3% per year, somewhat lower than the historic average due to tougher mining conditions, was assumed for all of the Central Appalachian area. This is

important to capacity since, at a mine producing 1.0 million tons per year (mmtpy) and experiencing a 10% gain in tons per man-hour, the mine either could produce 1.1 mmtpy with the same workforce after the gain or could lay off approximately 9% of its workforce (1/110% = 91%) and produce the same 1.0 mmtpy with fewer workers. In the first case, we have a productivity-induced capacity increase. One of the model inputs involves our projection of what proportion of productivity gain goes toward capacity increase versus workforce reduction and, although the calculations are somewhat complicated, it works out that less than half of the productivity gain is going toward capacity in the model runs.

Second, there is a well-established pattern in the coalfields of mines that are running at their maximum capacity making small capacity gains (usually through equipment upgrades) even if the true ROI economics are not there to justify this "smaller than major expansion" level of capital investment. Accordingly, we have a test in the model that determines if a step was 100% used in the previous year and has at least 7 years of reserve life remaining. If both of these conditions are met, then the mine capacity is very slightly "stretched" for that step on the order of 1%-2% to reflect this real-world phenomenon.

Both of these secondary capacity effects (productivity and "stretch") are allowed to occur before the economic "margin" test is made for bringing on major new expansion capital at a mine. The net effect is that a small amount of the "major capital" capacity expansion may be forestalled by the lesser amount of "creep" in capacity that occurs due to productivity gains and the "stretch" described above.

Since a major purpose of the study is to provide information for projecting economic differences between the separate scenarios modeled, we would like to know how much more or less capital is invested in new mining capacity for each scenario. We accomplish this by carefully tracking the exact type of mining for each new capacity addition brought on at each step on the mine cost curves. We then apply our estimate of capital investment per annual ton of new capacity (for that specific type of mining) to the total expansion tonnage of that type brought on in the model run. Our capital estimates are based on interviews with equipment manufacturers and coal producers as well as on published information regarding capital expenditures for new coal mines. Finally, we sum up these capital dollars across the different mining types and report the result by year by sub-region for each MTM/VF scenario.

On the electricity side, the NPM model brings on new baseload capacity in a manner very similar to the "margin" test procedure described for the UFEM model above. That is, since the NPM model is driven by dispatch bid costs (the major component of which is fuel cost for a coal-fired plant), a test is made against that dispatch bid cost. Whenever the wholesale price of electricity in a control area (most generally, a single utility) as measured by lambda cost exceeds the anticipated dispatch bid cost for a new gas-fired combined cycle ("new CC") plant by a large enough "margin" to generate a criterion 10% ROI, then a new CC plant is built in that control area.

New peaking capacity is brought on automatically in the NPM model to satisfy a classical "reserve margin" calculation for each control area. In the model runs, we used a 10% reserve margin criterion which is somewhat lower than the historic regulated 15% required by many public utility commissions but is obviously higher than levels that currently exist in some portions of the country

Because new coal-fired plants were not considered a serious option over the past several years, the model has been set up to "automatically" bring on only gas-fired new capacity. However, in recent times the consideration of new coal-fired capacity (either expansion or grass-roots) has resurfaced. For this reason, in model runs for clients over the past year or so (until we build a module for actually making economic trade-offs between gas-fired and coal-fired new capacity), we simply add by hand a selected few coal plants in the model in control areas where new coal plants would be most likely. We spread these new coal additions across the next decade timed to the model's signals that new capacity is needed. Those coal-fired by-hand additions are entered in the appropriate year before the model does its calculations of the need for the model-generated new gas-fired capacity. One of those hand-entered coal-fired facilities shows up in year 2009 in the VA sub-region in the results of new generating capacity shown later in this report.

III. Results

For both versions of the base case and for each of the four alternate mining regulatory scenarios (six cases in total), this study has generated model outputs for each year of the 2001-2010 period. These outputs form the basis for H&A's projections under each scenario for each year for the following variables:

- Coal tonnage
- Direct coal employment
- Mine capacity capital expenditures
- Average coal price, fob mine
- Megawatt-Hours of generation
- Average wholesale price (lambda costs) of electricity
- Environmental clean-up equipment capital expenditures for utilities
- Electricity capacity investments by type (construction, equipment, etc.)
- Major coal mine operating costs by category
- Average U.S. wholesale price (lambda costs) of electricity

Except for the U.S. wholesale price of electricity and the major coal mine operating costs by category, all of these variable outputs are provided by study sub-region.

Although much of the detail by sub-region is primarily needed for EIS Phase 3 modeling (outside of this study) of total direct and indirect economic impact on the economies of the states being studied, those detailed results are presented in their entirety for the reader in the Appendices to this report. The Appendices are organized in the same order as the

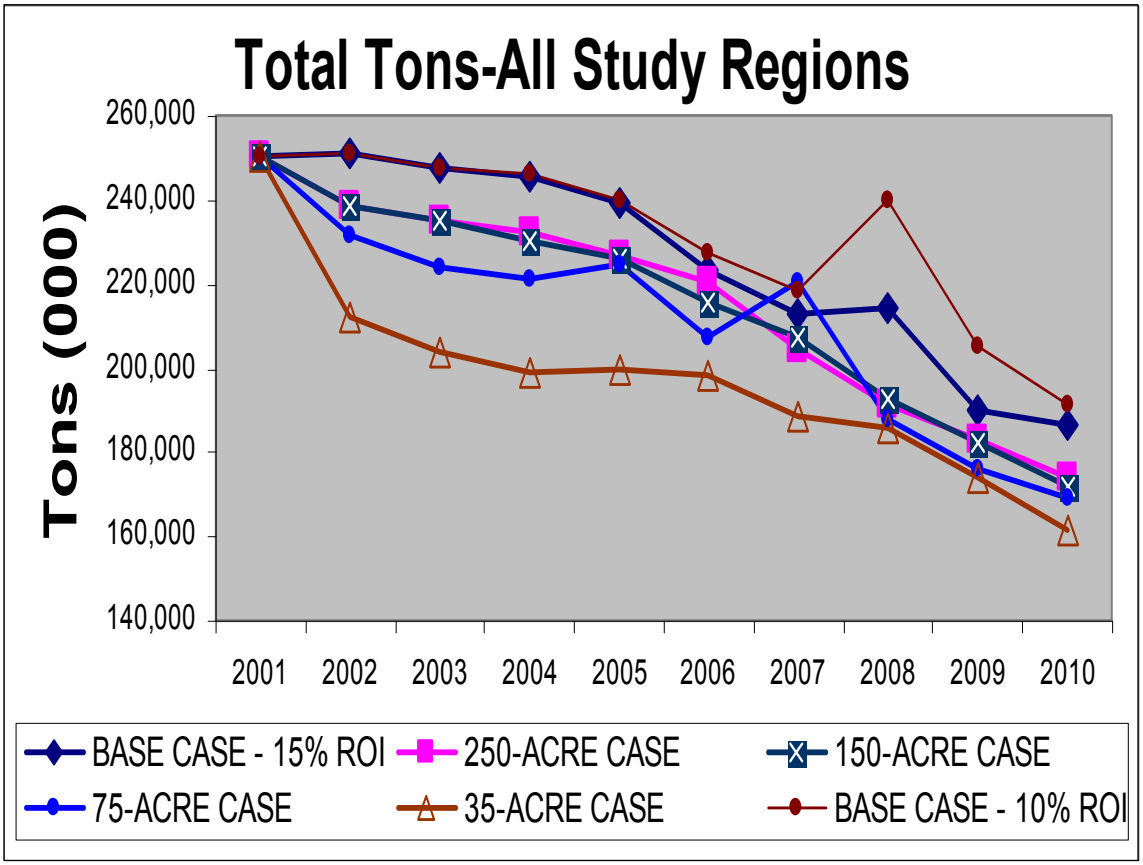
list immediately above. (Appendix A contains coal tonnage information, Appendix B coal employment numbers, etc.) All coal-production related parameters are reported by surface mining versus deep mining within each sub-region.

The remainder of this section of the report will focus on highlighting selected results, especially at a more aggregated level where appropriate, and providing descriptive and interpretive analysis of their meaning in the context of overall impacts of potential MTM/VF restrictions.

III.A. Coal Tonnage

Figure 4 presents a graph of the projected total coal tonnage by year from all of the MTM/VF directly-affected regions covered in this study. The numbers behind this graph are presented in the bottom section of Table A-1 in Appendix A.

Figure 4



There are several issues that arise from considering this graph. First, the general downward trend of total tonnage from the study region under all cases is a result we see across many modeling projects for different clients inside Hill & Associates. It is a reflection of the continuing economic and environmental adjustment of the coal

marketplace that has been occurring over the past few years in which Powder River Basin (PRB) coal from Wyoming has been gaining in market share while Appalachian coals in general have had declining market share. This is exacerbated toward the end of the 10-year study period by the fact that significant blocks of higher-quality Central Appalachian reserves are starting to be exhausted. The better-quality coals in this region are slowly but surely being mined out.

It is not the purpose of this MTM/VF study to delve into the general trend of PRB coal supplanting Appalachian coal – there are several good studies from government sources and from consultants covering that topic. Rather, it is sufficient here to note the trend and the fact that it will, of course, have a general bearing on this study since a higher level of demand over the decade of study would necessarily place more strain on the coal supply system from the area that may be restricted to some degree by MTM/VF regulations.

Second, consider the two versions of the Base Case (the top two lines through most of the graph). For the years 2002-2005 the 15% ROI Base Case and the 10% ROI Base Case fall virtually on top of each other so that there appears to be only one line and, in fact, there is only a miniscule difference between the graphs for those years. The reason for this congruence between the two cases in the first few years lies in the somewhat complicated real-world "balancing act" (discussed in the "Methodology" section above) in which capacity is both leaving and entering the mining cost-supply curve simultaneously. By examining the detailed model working files for each of the runs represented by a single point on the graph above, we have determined that for years 2001-2004, the entire region is expanding as fast as it can under the "Area Limits" which are determined by the amount of new expansion that an area of the coalfields can absorb in one year, given the labor force, transportation capabilities, etc. of the area.

During this early period, there is enough expansion capacity in the "lower" area of the curve(s) that the "Area Limit" is reached before either the 15% ROI or the 10% ROI limiting factor becomes controlling. In other words, all of the steps that are expanding until we reach the "Area Limit" are above 15% ROI, so that both the 10% and the 15% ROI criteria are met. Thus, both ROI cases experience the same capacity expansion and virtually identical model results.

Then, in 2005 enough of the low-cost steps have exhausted their low-cost reserves so that the "Area Limit" starts falling first between the 15% ROI threshold and the 10% ROI threshold and eventually higher than the 10% threshold. From this point forward, two things happen. First, we start seeing significantly more productive capacity available in the case where new investment needs only a 10% ROI. Since this tends to "flatten" the cost curve and "stretch" it to the right (imagine this happening to Figure 3), the market clearing price for coal will tend to be lower in the 10% ROI case as compared to the 15% ROI case, and the tonnage actually produced at this lower price will be somewhat higher in the 10% case.

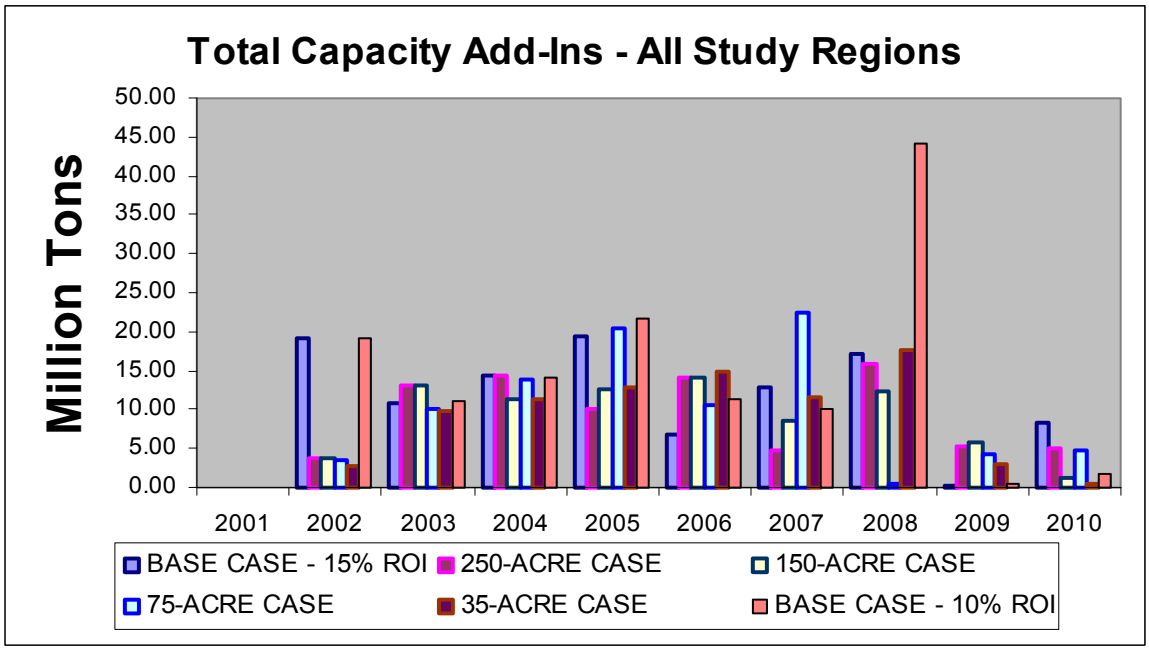
The second thing that happens as the "Area Limit" begins falling above one or both of the ROI limiting factors is that the actual cost curves in the 10% and 15% cases will start

diverging from each other in shape and level as more production is drawn from one than the other and more capacity is added (at different spots on the curve) to one versus the other. This second factor is important because a particular expansion that was economic under the 10% rule but not under the 15% rule is still available for expansion in a later year on the 15% curve as economics change over time. Thus, we frequently see some degree of "catching up" by the disadvantaged case in our model runs. This phenomenon does show up in Figure 4 above as we see the difference between the two versions of the Base Case going as high as 25 million tons in 2008 but then shrinking (the "catching up" phenomenon) down to roughly 5 million tons in 2010.

A very interesting indirect effect of possible MTM/VF restrictions becomes apparent as we consider the 25 million ton differential between the two versions of the Base Case in 2008. Remember that the setup assumptions included a likely EPA-mandated cut of 50% in Clean Air Act Phase 2 sulfur emission levels for year 2008, driven by the National Ambient Air Quality Standard for fine (2.5 micron) particulate matter. The indirect effect of the MTM/VF restrictions is that, to the extent that this aggressive changing of the mining rules does cause the coal mining investment community to perceive higher levels of investment risk and require a higher ROI, then the modeling results indicate that the production responsiveness of this high-quality portion of the coal industry (Central Appalachia produces almost all of the compliance coal from the eastern U.S.) is fairly severely dampened by the higher risk perception.

In other words, under "standard" investment perceptions in the Appalachian coalfields, the cut in allowed sulfur emissions along with the associated increase in demand for higher-quality, low-sulfur coals would ordinarily cause a surge in new capacity investment and associated economic development in Central Appalachia. However, given the three-way interplay between Appalachian coal mining costs, Powder River Basin coal mining costs and the utilities' costs of installing new scrubbers, it turns out that this stimulus toward new mining capacity in Central Appalachia is highly vulnerable to perceptions of investment risk. This is illustrated in the 2008 portion of the bar graph shown below in Figure 5.

Figure 5



This bar chart presents the tonnage version of the capacity additions which are reflected in dollar investment numbers in the formal study output deliverable in Appendix C, Table C-1. The left bar of each year's set is the 15% ROI Base Case, and the bar to the far right of each year's set is the 10% ROI Base Case. In support of the discussion above, we see for 2008 that in the case where only a 10% ROI is required for new coal mining investment, approximately 2½ times as much new capacity is installed. The numbers in Appendix C in Table C-1 indicate that the capital required for these two tonnage bars are roughly $320 million and $800 million, respectively (constant 2001$).

An additional point to note from Figure 5 is the substantial differentiation in year 2002 between the Base Case(s) on the one hand (about 19 million tons of new capacity) and the MTM/VF-affected cases (3-4 million tons) on the other hand. This is a direct result of the assumption, discussed in Section II.E above, of a "regrouping" by coal producers in the initial year of imposition of MTM/VF restrictions. In other words, during this initial year "regrouping" period, no ROI-driven major capital expansions are occurring in the MTM/VF-affected cases, and the 3-4 million tons of increased capacity comes totally from the productivity and "stretch" increments described in Section II.E above.

To some extent, the non-expansion in 2002 in the MTM/VF-affected cases may be causing somewhat higher expansion in later years (higher than what would have happened in the same case in those later years without the early-year reluctance to invest). Experience in running the H&A models has shown that a constraint such as this one-year "regrouping" non-expansion often results in a "pent-up" pressure which is released when the constraint is released. The exception to this rule is the situation where

a constraint of this type persists long enough for the competitive sources of supply (other coal fields) to over-expand and drive down overall prices on a sustained basis. However, this takes a few years to accomplish.

Turning now to the actual MTM/VF restricted cases in the tonnage production graph of Figure 4 near the start of this "Results" section, we see that all of the regulation-affected cases fall fairly uniformly below the Base Case(s), with the exception of the 75-Acre Case which will be discussed as a special situation later in this section. The fairly immediate separation between the curves in year 2002 is a function of three factors: (1) the assumption that any valley fill restrictions in a scenario are imposed instantaneously in 2002, (2) the "no grandfathering of existing operations" assumption discussed in Section II.C above, and (3) the one-year "regrouping" period during which no new ROI-driven capacity expansions occur as producers adjust to the new rules (as discussed in Section II.E above). Changing any one of these assumptions could have an impact on the timing and amount of separation between the curves, but the size of such an impact is uncertain without re-running the models because of the complicated interaction between "shortening" of the mine cost curves, price increases, ROI-driven capacity expansion, exhaustion of reserves at certain individual mines and competitive response from other coal fields such as the Powder River Basin and the Illinois Basin.

Table 3 below presents a brief synopsis (excluding the 75-Acre Case) of the general impact of the various levels of MTM/VF restriction as compared to the Base Case(s).

Table 3
Summary of Tonnage Impacts
(Excluding 75-Acre Case)

Time Period	Case	Total Study Region Annual Tonnage Loss vs. Base Case
2001 - 2005	250-Acre/150-Acre Cases	12 – 13 million tons (5% of Total Produc.)
	35-Acre Case	40 – 45 million tons (20% of Total Produc.)
2006 - 2007	250-Acre Case	3 - 8 million tons (2%-3% of Total Produc.)
	150-Acre Case	8 - 12 million tons (3%-5% of Total Produc.)
	35-Acre Case	25 – 30 million tons (10%-15% of Total Produc.)
2008	250-Acre/150-Acre Cases	12 – 48 million tons, depending on which Base Case (5%-20% of Total Produc.)
	35-Acre Case	16 – 55 million tons, depending on which Base Case (7%-23% of Total Produc.)
2009 - 2010	250-Acre/150-Acre Cases	8 - 20 million tons (4%-10% of Total Produc.)
	35-Acre Case	17 –30 million tons (8%-15% of Total Produc.)

One of the more interesting results, easily observable in Figure 4, is that the 250-Acre and 150-Acre Cases fall virtually on top of each other except for a little separation in the 2006-2007 period. For this reason, the table above presents both of these cases as one entity for the other time periods. The primary reason for these congruent results is the similarity in the amount of reserve diminution for these two cases in the RTC results from Phase 1 of the EIS support work.

Until Phase 3 of the EIS support studies is completed, we cannot answer just how substantial is the impact of the tonnage loss shown in Table 3. However, by way of benchmark comparison, the lower end of this market loss (5%-10%) is about the impact on the nation-wide coal market that the Ozone/Fine Particle rules of the National Ambient Air Quality Standards are projected to have. The upper end of the above market loss (40%-50%) is the projected nation-wide coal market loss if Kyoto-based "Global Warming" CO_2 limits are imposed in the U.S.

Referring back to Figure 4, we see that the 75-Acre Case does not seem to fall cleanly into this neat hierarchical pattern (at least not in selected years). What happened – Why does this case bounce around so erratically?

The answer again involves this somewhat complicated real-world "balancing act" (discussed in the "Methodology" section above) in which capacity is both leaving and entering the mining cost-supply curve simultaneously. It was mentioned earlier that some of the reserves in Central Appalachia are becoming low enough that they will start being exhausted within the 10-year study period. In one respect, we might consider the 35-Acre Case, in which substantial reserves have been rendered unmineable, as simply accelerating that situation so that the graph of the 35-Acre Case in Figure 4 immediately starts out (in 2002) already on that lower track that the other cases eventually reach near the end of the study period. On this lower track, there simply are not enough expansion reserves available at low enough cost levels (either because they were initially sterilized in the 35-Acre Case by MTM/VF regulations or because they are exhausted through production in the other cases) to keep the total market tonnage up above 200 million annual tons.

Now consider the 75-Acre Case which falls on the "knife-edge" between the upper track and the lower track discussed above. The amount of reserves made unmineable in the 75-Acre Case is not so large as to immediately throw it into the same situation as the 35-Acre Case where, from the very beginning, there are not enough expansion reserves to keep up. Rather, there <u>are</u> just enough expansion reserves to respond to price signals exceeding the ROI investment criterion, but these reserves (as well as the non-expansion reserves supporting existing capacity) have been cut very thin by the MTM/VF rules. Thus, many steps on the mining cost curve(s) have their reserves exhausting fast and furiously after the first two or three years. As so many reserves exhaust rapidly, strong price signals are sent for expansion; so strong, in fact, that quite a lot of new capacity surges in, and the tonnage curve actually bends upward momentarily.

However, both the expansion reserves and the reserves supporting existing capacity are again so thin due to the MTM/VF regulations that they continue to exhaust at a fast and furious pace, driving productive capacity down again. As the cycle repeats, strong price signals spur another big surge in expansion which turns the production tonnage curve upward again, only to have it sag the next year as thin reserves race toward exhaustion. Finally, there is enough exhaustion that the case becomes very similar to the 35-Acre Case where there simply are not enough expansion reserves to keep up, even for one year.

In summary, this is analogous to an attempt to fill a wooden trough with water by pouring in large bucketfuls, but there are many small holes in the sides of the wooden trough. With each bucketful poured in, we can momentarily raise the trough's water level, but it quickly runs back out of the holes. After a while, the reservoir from which we are drawing the bucketfuls becomes lower and lower, so that eventually we can only draw half-bucketfuls or quarter-bucketfuls. At the end of the day, we simply cannot overcome the outflow but can only slow down the continuing drop in water level.

There are two ways to look at this type of "knife-edge" effect. One way is to dismiss it as a modeling phenomenon and say that if we had chosen a slightly different ROI threshold for this case or had used 80 acres as the criterion instead of 75 acres, then we might very easily have fallen on one side or the other of the "knife-edge." The other approach (and the one we prefer) is to recognize that the model is telling us something. There is, in fact, a zone in here somewhere (that we have bracketed with the span of scenarios) where the market signals can get somewhat erratic because there is just enough resource in the producer segment of the coal industry to respond to price signals, albeit inadequately.

III.B. Coal Prices

Having discussed price signals at some length, let's turn our attention to the actual price outputs from the models that correspond to the tonnage results. Figures 6a and 6b below presents the weighted average prices for the coal totals of Figure 4. Again, it is important to note that these are short-term market clearing prices for new business and do not include any older "out of market" contract prices.

Figure 6a

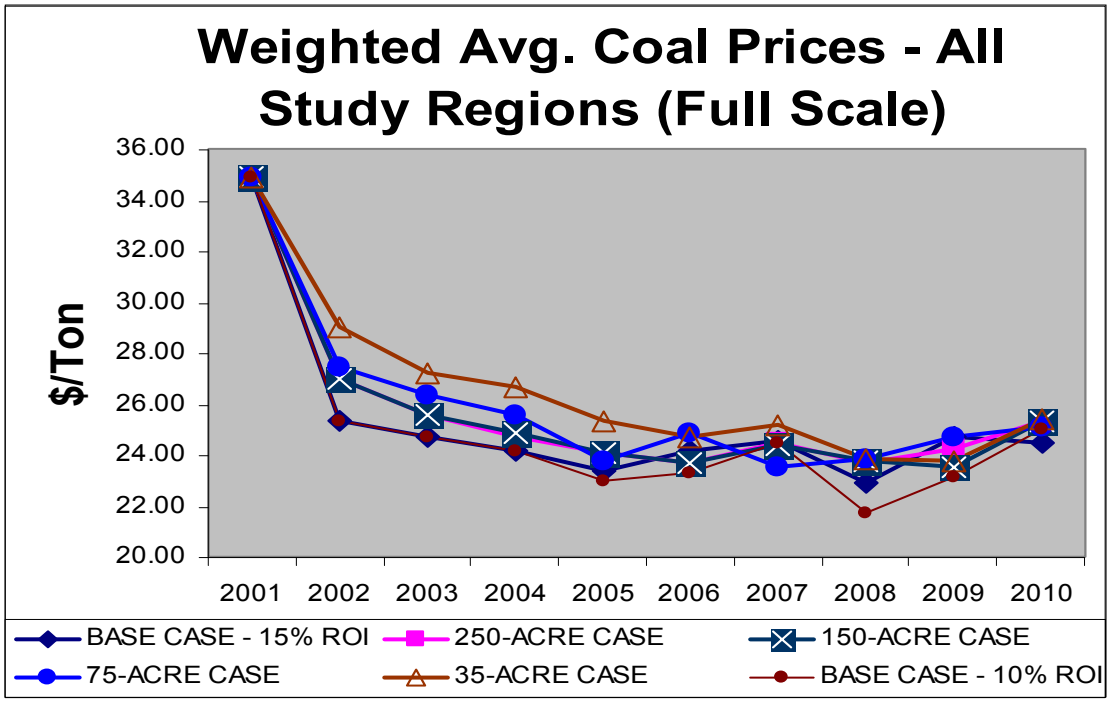
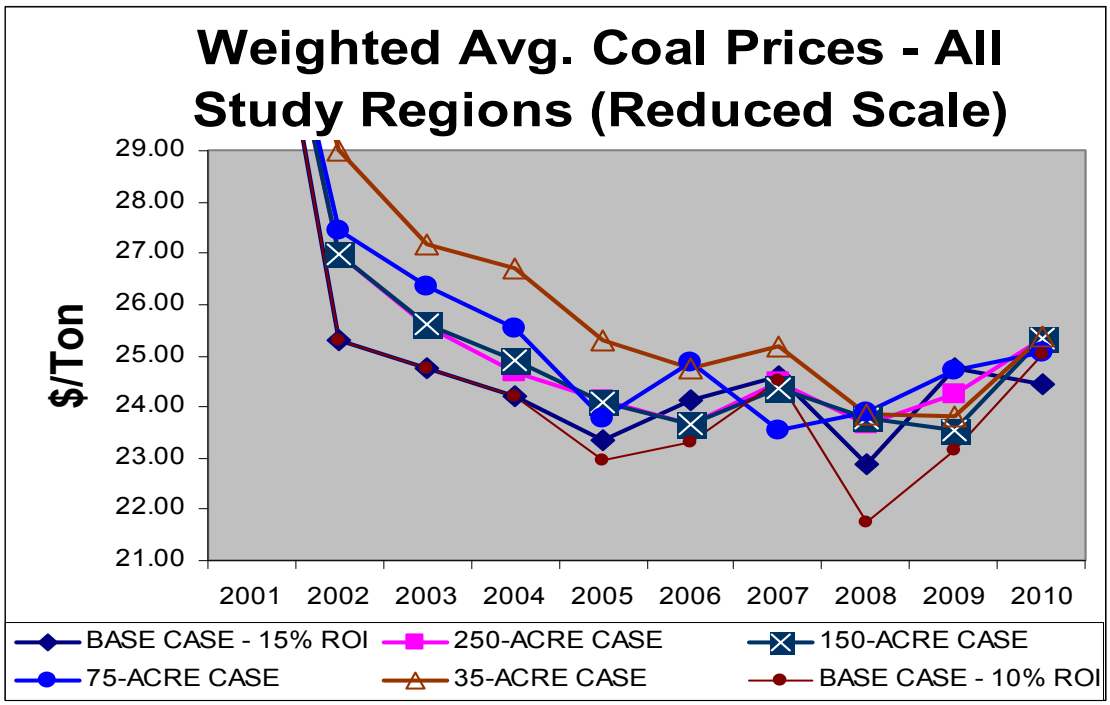


Figure 6a is presented on a scale of $20 to $36 per ton in order to show that the fall from the "once-in-a-quarter-century" market of 2001 is likely to be two to three times as large as the price differentials between the various MTM/VF scenarios. However, it should be noted that the reason for the large initial drop on the graph is due to the fact that the mid-2001 market was operating near the far right-hand edge of the cost curves. Referring back to Figure 3 from the "Methodology" section of this report, we can see that if we are very near the right-hand edge of the curve, then we can experience prices that are quite high. However, since the curve is so steep here, even a small increase in capacity lower on the curve (as producers attempt to produce more to take advantage of high prices) can "stretch" the curve to the right enough to cause a dramatically large drop in market clearing price. In other words, on a steep curve it does not take much horizontal movement to slide down a long way vertically.

On the other hand, the price differentials between the MTM/VF scenarios are occurring down on the flatter portion of the Figure 3 curve and represent perhaps more significant tonnage impacts. We see this on a gross scale by considering that the tonnage differences discussed above between scenarios is often on the order of 15-50 million annual tons, and this magnitude of tonnage is associated with price differentials in the $2.50-$3.50 per ton range. This means that we are operating on a less steep portion of the curve where large horizontal capacity movements correspond to lesser vertical movements in cost.

In order to focus on the subject of this study, Figure 6b is presented as identical to Figure 6a except that the scale is limited to $21 to $29 per ton to more easily visualize the roughly $2.50-$3.50 differences between scenario results.

Figure 6b



As we would expect, the prices shown in Figure 6b are almost exactly the inverse of the tonnage graph of Figure 4. That is, the lowest prices generally occur for the least restricted Base Case(s) where the tonnages from Figure 4 are higher. However, as the "catching up" phenomenon occurs (see earlier discussion), we would expect to see some crossing over of the prices as the relative shortness of supply for the more restricted cases eventually sends some pretty strong price signals. In fact, we see a very clear trend that the largest coal price differentials between scenarios occur immediately after the implementation of MTM/VF restrictions, and then these differences attenuate over time as the "catching up" phenomenon occurs. As discussed earlier, the 2008 "bump" in the graph is a measure of the coal marketplace response to the PM2.5-driven cut in SO_2 limits.

It is significant to note that despite (1) continuing productivity gains, which serve both to lower individual points on the Figure 3 cost curve and also to stretch the entire curve to the right, and (2) lower overall tonnages in later years, which means demand crosses farther to the left on the Figure 3 cost curve, we still see prices in Figure 6b holding relatively flat in the second five years of the study period. This is an indication of fairly strong prices (compared, say, to other areas of the coalfields) due to shortness of supply,

even in the Base Case(s) which experience some reserve exhaustion near the end of the 10-year study period.

Finally, as we would expect, the 10% ROI Base Case prices are lower than the 15% ROI Base Case prices since there is more capacity expansion and therefore more supply in the supply/demand balance in the 10% case.

III.C. Coal Mining Employment

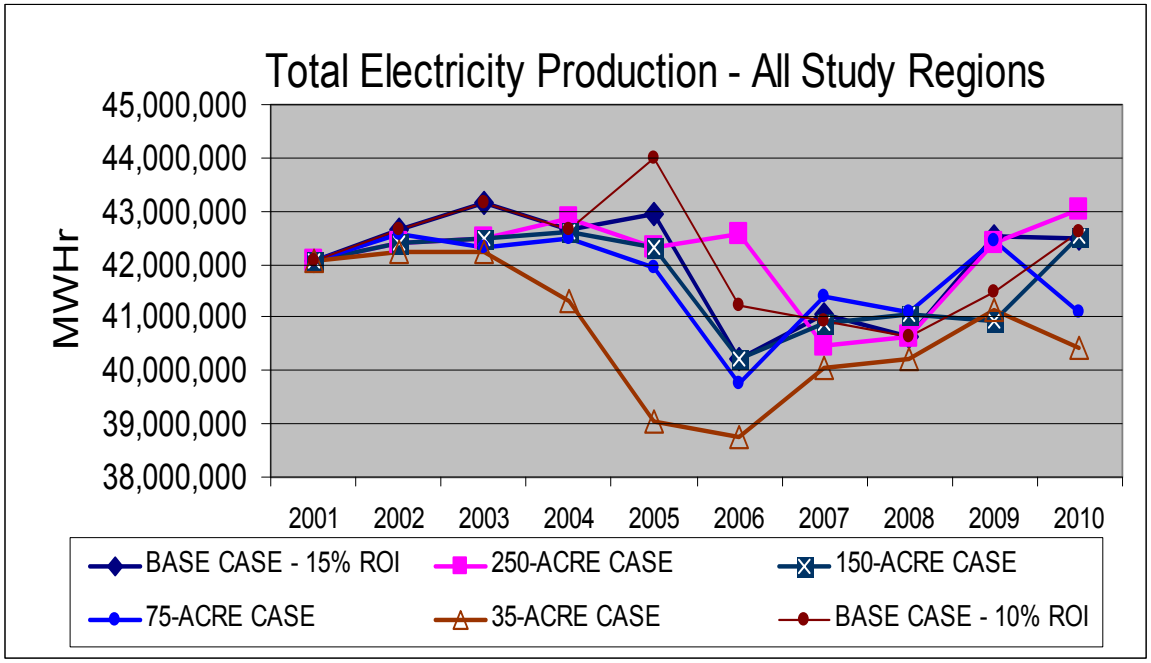
Before we leave the coal side of the results discussion, a couple of comments about the direct coal employment tables in Appendix B are appropriate. First, these "direct" employment numbers are very narrowly defined as really directly "in the mine" employees and would need a scale-up factor of perhaps 2.0 to match up with the officially reported state "coal mining employment" numbers. For example, we are showing an all-region total of 17,845 "direct" employees for 2001 in Appendix B, but Hill & Associates' own monthly short-term coal outlook lists official state coal mining employment numbers for July 2001 of approximately 3,900 for northern West Virginia, 12,100 for southern West Virginia, 12,500 for eastern Kentucky and 5,600 for Virginia. This total of more than 34,000 "official" coal mining employees for one summer month is roughly twice our modeling estimate of "direct" coal mining employees average for the year.

Second, although the last year of the study period shows a maximum "direct" employment loss of a little over 1,000 employees, the loss of employment in some mid-years can exceed 3,500 employees (e.g. comparing the 75-Acre Case with the 10% ROI Base Case for year 2008).

III.D. Electricity Generation Within the Study Region

Turning now to the electricity results from the integrated coal and electricity modeling system, Figure 7 below presents the electricity produced from the total study region under each scenario. The numbers behind this graph are presented in the bottom section of Table E-1 in Appendix E.

Figure 7



Two things are immediately apparent from Figure 7. First, there is a very loose general correlation with the coal results, in that the less restricted cases (the Base Cases and the 250-Acre Case) with their generally lower coal prices tend to be the ones showing higher electricity production, while the more restricted cases such as the 35-Acre Case with higher coal prices show lower electricity generation. Second, the electricity results are definitely NOT an exact mirror image of the coal results.

Upon reflection, this second point is not at all surprising. The coalfields included in the study region do, of course, supply the electric generating plants sitting on top of the coal, but they also supply many other electric generating stations outside of the study region. The issue of who wins and who loses the dispatch wars on the electric grid is an extremely complicated one and is one of the primary reasons why we run an integrated coal and electricity modeling system. There are many thresholds at individual generating stations where a change in coal prices for a certain quality of coal can result in the decision to install a scrubber, for example, and burn high-sulfur Pennsylvania or Ohio coal.

Particular differences between the electricity production graph of Figure 7 and the coal production graph of Figure 4 include the following:

- Unlike the coal results, the electricity results do not show the largest spread between scenarios immediately after the MTM/VF rules are implemented. Rather, the largest spread of electric generation across scenarios occurs after four or five years.

- The biggest sensitivity for electric generation appears to occur in response to the 19-State SIP Call for NO_x in 2005, while the coal tonnage maximum sensitivity seems to be oriented around the PM2.5-driven SO_2 cuts in 2008.

- While the absolute magnitude of coal tonnage impacts can be as high as 20%-25% of total production (see Table 3 above) and more typically runs a spread of 8%-15% difference between the most-restrictive and least-restrictive cases in most years; the electric generation spreads are more in the 2%-6% range in most years, going only to a maximum of about 11% of total production in 2005.

- The 250-Acre and 150-Acre Cases do not fall on top of each other in the electricity graph. Rather, the 250-Acre Case shows substantially higher electricity generation inside the study region than the 150-Acre Case for some of the mid-years and late-years.

- There appears to be significantly more cross-over between the scenarios in the electricity results. That is, the scenarios do not line up monotonically from least restrictive to most restrictive as they seem to do for coal tonnage (except for the 75-Acre Case in the coal results).

In summary, while we have both coal production and electricity production that can shift "just over the border" outside the study region and therefore not be included in the results reported here, there are generally wide quality differences between Pennsylvania/Ohio coal, for example, and Central Appalachian coal that limit the amount of direct substitution without equipment or allowance costs. Thus, the coal results tend to be more directly related to the severity of MTM/VF restriction. On the other hand, electricity as a product is so extraordinarily homogeneous that the shifting of power generation across the study region's border is a significant factor that disrupts the direct relationship between coal supply reduction and electric generation within the study region.

III.E. Electricity Prices

Figures 8a and 8b presents the model output electricity prices associated with the generation discussed above. The numbers behind the graph are shown in the bottom section of Table F-1 in Appendix F.

Figure 8a

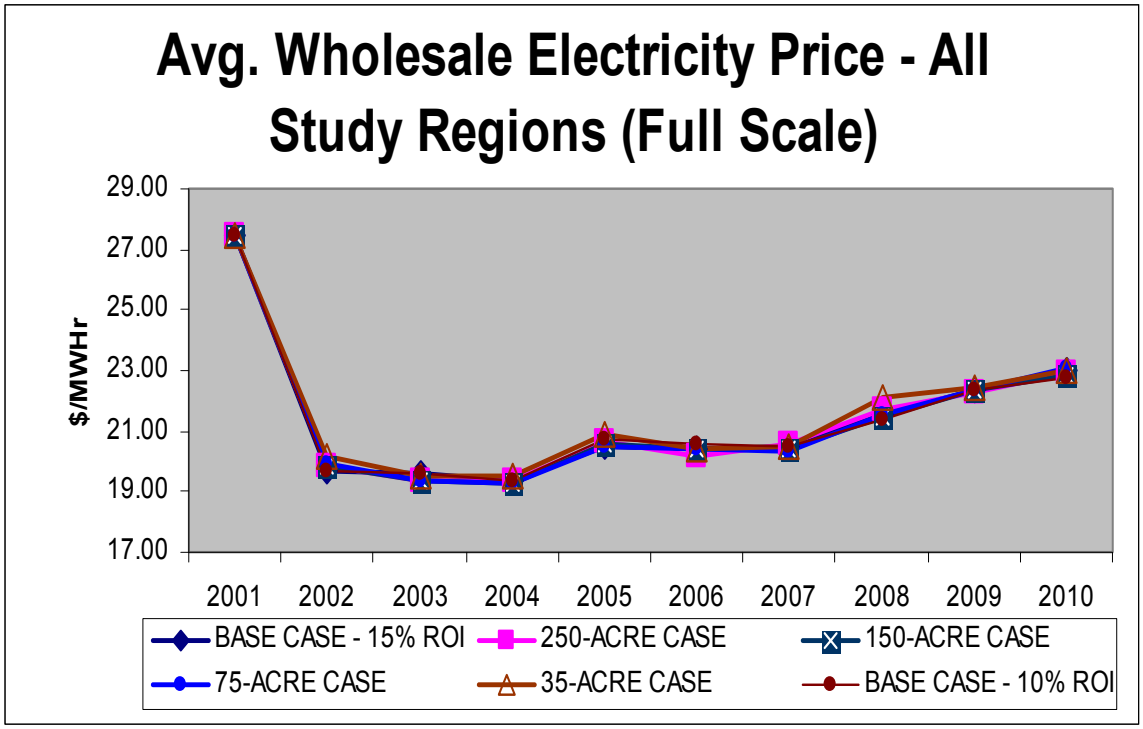
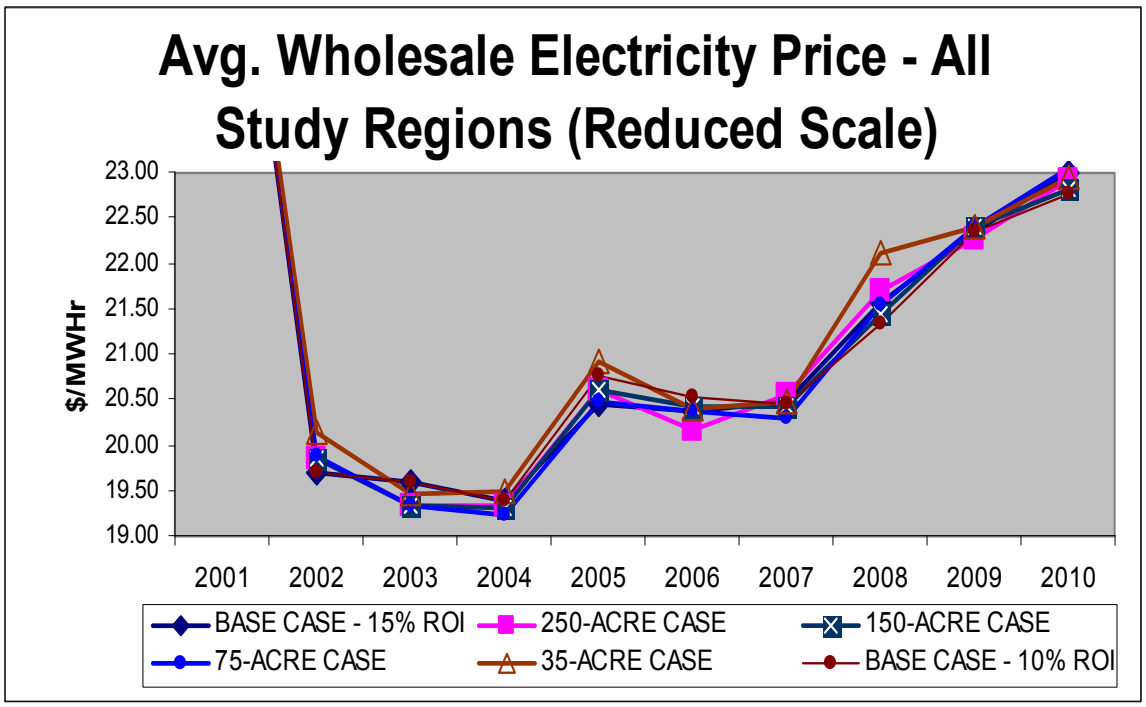


Figure 8a is presented on a scale of $17.00 to $29.00 dollars (constant 2001$) per megawatt-hour. This illustrates that the size of the electricity price drop that will accompany the expected coal market "bust" following the current "once-in-a-quarter-century" market boom is several times larger than the electricity price sensitivity to the MTM/VF scenarios.

In order to focus on the topic of this study, Figure 8b is identical to Figure 8a except that the scale is reduced to $19.00 to $23.00 per megawatt-hour.

Figure 8b



Even on this scale, it is evident that the electricity prices are quite insensitive to the MTM/VF restrictions, showing differences of only 1%-2%, or 3% at the maximum. This is a simple mechanical function since the models solve for the market clearing price (lambda cost) of electricity for each "control area" (most generally, a single utility). This mirrors the real world in which only one lambda cost exists at any one time in a competitive section of the transmission grid. Since this lambda cost is defined as the dispatch bid (assumed to be actual variable dispatch cost in the model) of the very last, or highest-cost, generator to be dispatched in any time period, that generator may or may not be affected by the price of coal from the MTM/VF study region. In fact, that last generator may be a gas-fired plant in some time periods.

Thus, while we may be calculating a weighted average of AEP and APS prices for the WV_N (northern West Virginia) sub-region, for example, each of those utilities span areas and generators outside of the study area as well as inside. Accordingly, the effects of MTM/VF restrictions are greatly diluted as we consider the wholesale price of electricity on the competitive transmission grid.

It is important to note that wholesale electricity prices, as modeled by lambda costs, may not be reflective of retail electricity prices, especially in a regulated electric utility environment. In particular, consider the hypothetical situation where a gas-fired plant is the "last" plant dispatched, and its dispatch cost is determining the price of electricity. Theoretically, we might raise the cost of many coal-fired plants lower on the dispatch cost curve and thereby substantially reduce the profitability of those coal plants (and

perhaps the total utility) operating against the electricity price still being established by the gas-fired plant. The model would still yield the same lambda cost of the "last" generator, but the utility might very well file for a regulated rate increase due to higher average costs and reduced overall profitability of its entire portfolio of generators.

The overall U.S. average wholesale electricity price (lambda cost) for each scenario, needed by the anticipated model to be used in EIS support Phase 3, is listed in Table J-1 in Appendix J.

III.F. Capital Expenditures at Electric Plants

Table G-1 in Appendix G shows that, in general, there is no significant difference across MTM/VF scenarios in capital expenditures for environmental clean-up equipment at coal-fired generating plants. The one exception is in year 2004 when all of the MTM/VF restricted scenarios spend about $15 million (constant 2001$) more than the level of $18-$19 million in the Base Case(s).

Detailed examination of the plant-level model output reveals that this additional $15 million dollars is due to the fact that one large plant grouping in the model, Units 1-3 at AEP's John E. Amos Plant, only partially scrubs (about 55%) in the Base Case(s) in 2004. In other words, at the coal prices in the Base Case(s), the best economics are to install scrubbing on only 55% of that unit grouping, and the remainder remains unscrubbed. However, at the coal prices of each of the MTM/VF restricted cases, the best economics are to install 100% scrubbing at this unit grouping at the correspondingly higher capital cost.

Turning to capital expenditures for new generating capacity, we see from Tables H-1 in Appendix H that the models call for new capacity only in the Virginia sub-region of the study area. Summation across the years reveals that the total capital investment (constant 2001$) across the entire 10-year period is about $1,160 million for New Combined-Cycle gas-fired baseload units, plus about $300 million for New Gas-Turbine peaking units and around $700 million for a new coal-fired generating station. This $2.2 billion capital investment adds about 3400 MW of baseload capacity and roughly 1200 MW of peaking capacity.

Finally, the model anticipated to be used in EIS support Phase 3 requires a one-time breakdown of major coal mine operating costs by category. Those numbers are presented in Table I-1 in Appendix I.

APPENDICES

Table A-1

Total Tons - Surface and Deep Mines Combined

ProductionTons (000)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	37,850	37,112	36,823	33,002	31,176	33,170	33,894	41,195	33,984	29,059
BASE CASE - 15% ROI	37,850	37,112	36,823	33,002	31,422	32,007	33,767	35,551	31,630	26,355
250-ACRE CASE	37,850	36,193	36,774	33,701	31,964	30,886	29,025	29,686	31,040	25,977
150-ACRE CASE	37,850	36,235	36,764	33,661	31,855	30,769	28,803	29,498	30,731	26,092
75-ACRE CASE	37,850	35,210	34,894	31,764	29,911	26,389	26,460	25,917	27,287	23,130
35-ACRE CASE	37,850	33,392	27,389	25,152	24,414	24,519	22,649	26,140	27,617	23,034
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 2										
BASE CASE - 10% ROI	49,100	46,844	46,224	46,608	40,984	32,500	36,086	34,865	28,029	23,534
BASE CASE - 15% ROI	49,100	46,844	46,074	46,599	41,518	33,638	35,576	35,765	27,881	27,768
250-ACRE CASE	49,100	42,903	42,522	42,398	43,787	34,633	31,040	33,043	27,504	23,835
150-ACRE CASE	49,100	42,903	42,482	43,177	43,426	34,093	30,769	31,944	25,817	23,319
75-ACRE CASE	49,100	42,746	42,880	43,419	42,577	36,946	32,564	30,616	24,684	26,238
35-ACRE CASE	49,100	41,361	40,668	42,055	43,418	36,341	33,160	29,975	23,527	21,542
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 3										
BASE CASE - 10% ROI	1,690	1,575	1,407	1,406	1,114	844	1,020	665	1,077	1,106
BASE CASE - 15% ROI	1,690	1,575	1,407	1,406	1,114	1,035	1,023	993	1,104	1,106
250-ACRE CASE	1,690	1,708	1,552	1,357	1,084	825	999	1,003	1,134	1,136
150-ACRE CASE	1,690	1,708	1,552	1,531	1,064	995	1,003	1,114	1,136	1,207
75-ACRE CASE	1,690	1,708	1,675	1,562	1,073	1,005	993	1,124	1,146	1,186
35-ACRE CASE	1,690	1,668	1,672	1,429	1,098	1,108	1,132	1,072	912	982
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 4										
BASE CASE - 10% ROI	90	120	50	0	0	0	0	0	0	40
BASE CASE - 15% ROI	90	120	50	0	0	0	0	0	40	41
250-ACRE CASE	90	81	90	0	0	0	0	0	40	41
150-ACRE CASE	90	81	80	0	0	0	0	0	40	41
75-ACRE CASE	90	81	30	0	0	0	0	0	40	41
35-ACRE CASE	90	51	41	41	0	0	40	0	40	41
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV C										
BASE CASE - 10% ROI	31,460	29,662	30,302	30,078	28,493	33,809	23,213	23,099	12,488	13,676
BASE CASE - 15% ROI	31,460	29,662	30,447	30,018	26,772	32,447	21,555	16,371	13,869	18,263
250-ACRE CASE	31,460	30,761	30,520	27,994	23,996	28,024	32,083	16,982	15,033	11,166
150-ACRE CASE	31,460	30,761	30,520	29,272	23,946	28,024	32,093	17,705	14,478	10,831
75-ACRE CASE	31,460	28,545	25,300	24,905	23,585	27,747	31,807	19,847	13,850	10,130
35-ACRE CASE	31,460	22,375	22,724	22,994	22,210	23,031	10,814	11,092	8,837	8,495
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV E										
BASE CASE - 10% ROI	890	658	679	699	648	739	761	782	1,004	1,026
BASE CASE - 15% ROI	890	658	679	699	720	740	761	782	1,004	1,026
250-ACRE CASE	890	864	679	699	720	740	761	782	1,004	1,026
150-ACRE CASE	890	864	679	699	720	740	761	782	943	1,025
75-ACRE CASE	890	864	823	699	720	740	761	782	1,004	1,026
35-ACRE CASE	890	864	884	843	713	724	734	745	895	844

Table A-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	35,080	39,019	42,631	44,639	46,765	48,120	47,144	46,330	41,430	42,893
BASE CASE - 15% ROI	35,080	39,019	42,631	44,639	46,765	48,241	47,147	44,586	40,898	41,454
250-ACRE CASE	35,080	35,767	38,943	43,151	45,479	47,120	46,842	43,016	42,515	41,380
150-ACRE CASE	35,080	35,667	38,943	43,222	45,479	47,120	46,842	43,016	42,495	41,379
75-ACRE CASE	35,080	35,308	38,945	43,244	47,417	49,297	49,118	44,566	43,851	42,943
35-ACRE CASE	35,080	34,958	38,965	43,244	47,581	50,099	50,098	47,175	45,025	39,467

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	5,750	5,413	4,431	1,849	1,477	1,117	1,127	1,064	544	554
BASE CASE - 15% ROI	5,750	5,413	4,431	1,849	1,477	1,117	1,127	1,064	544	554
250-ACRE CASE	5,750	5,238	3,211	1,159	838	788	788	685	185	185
150-ACRE CASE	5,750	5,308	3,251	1,159	838	788	788	365	185	185
75-ACRE CASE	5,750	5,238	3,703	1,882	1,530	1,190	1,221	1,252	1,283	1,314
35-ACRE CASE	5,750	4,499	3,417	1,233	553	513	529	539	550	560

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	61,190	62,379	55,381	58,943	66,136	53,564	50,552	69,764	65,887	57,483
BASE CASE - 15% ROI	61,190	62,379	55,381	58,923	66,682	50,323	46,895	56,022	50,730	46,768
250-ACRE CASE	61,190	58,800	53,326	51,634	51,662	54,304	38,060	42,529	42,354	46,852
150-ACRE CASE	61,190	58,790	53,216	47,398	51,052	50,086	41,243	44,652	44,252	45,551
75-ACRE CASE	61,190	55,018	47,253	43,721	51,096	40,508	52,699	39,828	41,437	41,014
35-ACRE CASE	61,190	45,891	40,083	32,996	33,663	40,485	45,606	45,100	45,194	44,152

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	134,370	137,131	133,423	136,208	143,518	137,349	122,798	141,038	121,352	115,633
BASE CASE - 15% ROI	134,370	137,131	133,568	136,128	142,415	132,868	117,484	118,824	107,044	108,066
250-ACRE CASE	134,370	131,429	126,678	124,638	122,695	130,977	118,534	103,993	101,090	100,608
150-ACRE CASE	134,370	131,389	126,608	121,749	122,035	126,758	121,727	106,520	102,353	98,971
75-ACRE CASE	134,370	124,971	116,024	114,451	124,348	119,482	135,606	106,274	101,424	96,426
35-ACRE CASE	134,370	108,586	106,074	101,311	104,720	114,852	107,781	104,651	100,500	93,519

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	88,730	85,651	84,503	81,016	73,273	66,513	71,000	76,725	63,090	53,739
BASE CASE - 15% ROI	88,730	85,651	84,353	81,008	74,053	66,680	70,367	72,310	60,655	55,270
250-ACRE CASE	88,730	80,885	80,938	77,456	76,835	66,343	61,064	63,732	59,718	50,989
150-ACRE CASE	88,730	80,927	80,878	78,369	76,345	65,857	60,576	62,556	57,723	50,658
75-ACRE CASE	88,730	79,745	79,479	76,745	73,561	64,340	60,017	57,656	53,157	50,595
35-ACRE CASE	88,730	76,472	69,769	68,677	68,930	61,967	56,981	57,186	52,095	45,599

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	27,200	28,032	29,777	28,625	22,886	23,265	24,662	22,212	21,061	22,254
BASE CASE - 15% ROI	27,200	28,032	29,777	28,516	23,013	23,929	25,132	23,123	22,491	23,071
250-ACRE CASE	27,200	26,463	27,643	29,980	27,182	23,020	24,702	23,818	22,174	22,729
150-ACRE CASE	27,200	26,463	27,643	30,031	27,390	23,027	24,768	23,772	21,961	22,116
75-ACRE CASE	27,200	26,802	28,498	30,141	26,690	23,551	25,090	24,269	21,735	22,367
35-ACRE CASE	27,200	26,775	27,722	29,178	26,032	21,416	24,089	23,788	21,300	22,086

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	250,300	250,814	247,703	245,849	239,677	227,127	218,460	239,975	205,504	191,626
BASE CASE - 15% ROI	250,300	250,814	247,698	245,651	239,481	223,477	212,983	214,257	190,191	186,407
250-ACRE CASE	250,300	238,777	235,258	232,074	226,711	220,340	204,300	191,543	182,983	174,326
150-ACRE CASE	250,300	238,779	235,128	230,150	225,770	215,642	207,071	192,847	182,038	171,744
75-ACRE CASE	250,300	231,518	224,000	221,338	224,598	207,374	220,713	188,199	176,315	169,388
35-ACRE CASE	250,300	211,833	203,565	199,165	199,682	198,235	188,852	185,625	173,895	161,203

Table A-2

Total Tons - Surface Mines Only
ProductionTons (000)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	17,410	19,041	18,258	14,578	13,329	13,415	13,735	14,421	11,951	9,717
BASE CASE - 15% ROI	17,410	19,041	18,258	14,578	14,078	13,659	13,740	12,587	10,910	9,103
250-ACRE CASE	17,410	16,935	17,523	14,972	13,457	13,230	11,498	9,649	8,275	7,339
150-ACRE CASE	17,410	16,925	17,513	14,932	13,348	13,195	11,398	9,591	8,226	7,299
75-ACRE CASE	17,410	15,865	15,378	13,034	10,100	7,720	6,821	6,104	4,996	3,830
35-ACRE CASE	17,410	13,370	7,502	5,915	4,087	3,366	3,143	2,486	1,575	1,689

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 2										
BASE CASE - 10% ROI	19,470	19,130	16,819	13,982	12,010	11,897	12,575	10,314	11,194	10,361
BASE CASE - 15% ROI	19,470	19,130	16,819	13,982	13,544	12,698	12,080	13,024	11,277	10,283
250-ACRE CASE	19,470	15,784	14,819	12,796	12,664	10,218	9,427	8,397	7,663	7,606
150-ACRE CASE	19,470	15,784	14,779	13,370	12,235	9,677	8,967	8,217	7,493	7,536
75-ACRE CASE	19,470	15,576	14,336	12,935	9,617	9,746	8,535	8,187	8,435	8,031
35-ACRE CASE	19,470	13,370	11,405	8,824	7,876	7,002	6,456	6,349	6,456	7,157

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 3										
BASE CASE - 10% ROI	1,020	819	644	634	331	50	201	30	312	338
BASE CASE - 15% ROI	1,020	819	644	634	331	221	205	205	336	338
250-ACRE CASE	1,020	952	788	603	300	30	201	205	336	338
150-ACRE CASE	1,020	952	788	778	300	201	205	316	338	409
75-ACRE CASE	1,020	952	901	778	300	201	205	316	338	409
35-ACRE CASE	1,020	912	898	635	294	294	314	254	144	214

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 4										
BASE CASE - 10% ROI	80	120	50	0	0	0	0	0	0	40
BASE CASE - 15% ROI	80	120	50	0	0	0	0	0	40	41
250-ACRE CASE	80	81	90	0	0	0	0	0	40	41
150-ACRE CASE	80	81	80	0	0	0	0	0	40	41
75-ACRE CASE	80	81	30	0	0	0	0	0	40	41
35-ACRE CASE	80	51	41	41	0	0	40	0	40	41

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV C										
BASE CASE - 10% ROI	23,230	22,290	22,580	21,868	22,748	28,961	18,704	16,971	7,305	8,548
BASE CASE - 15% ROI	23,230	22,290	22,726	21,868	21,088	27,432	16,575	12,646	11,090	15,559
250-ACRE CASE	23,230	23,585	23,035	20,478	16,634	23,282	27,092	13,313	11,903	8,232
150-ACRE CASE	23,230	23,585	23,035	21,273	16,584	23,282	27,093	13,651	11,450	7,876
75-ACRE CASE	23,230	21,369	17,753	16,854	16,223	22,461	26,814	15,742	10,375	7,185
35-ACRE CASE	23,230	15,196	15,177	14,943	14,243	17,675	5,666	4,219	4,045	3,522

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV E										
BASE CASE - 10% ROI	630	391	401	411	350	431	442	453	664	677
BASE CASE - 15% ROI	630	391	401	411	422	432	442	453	664	677
250-ACRE CASE	630	596	401	411	422	432	442	453	664	677
150-ACRE CASE	630	596	401	411	422	432	442	453	604	676
75-ACRE CASE	630	596	545	411	422	432	442	453	664	677
35-ACRE CASE	630	596	607	555	415	415	415	415	555	495

Table A-2 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	1,480	1,175	517	144	72	133	275	216	377	470
BASE CASE - 15% ROI	1,480	1,175	517	144	72	254	277	216	448	471
250-ACRE CASE	1,480	1,293	296	215	134	134	275	215	235	466
150-ACRE CASE	1,480	1,193	296	286	134	134	275	215	215	465
75-ACRE CASE	1,480	833	298	308	93	274	134	214	277	468
35-ACRE CASE	1,480	483	318	308	256	276	277	256	215	466

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	1,210	1,223	1,078	328	339	349	359	370	380	390
BASE CASE - 15% ROI	1,210	1,223	1,078	328	339	349	359	370	380	390
250-ACRE CASE	1,210	1,048	191	21	21	21	21	21	21	21
150-ACRE CASE	1,210	1,118	231	21	21	21	21	21	21	21
75-ACRE CASE	1,210	1,048	338	328	339	349	359	370	380	390
35-ACRE CASE	1,210	308	318	328	339	349	359	370	380	390

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	27,730	30,668	27,159	29,650	32,438	17,345	12,020	23,483	24,205	20,778
BASE CASE - 15% ROI	27,730	30,668	27,159	29,650	32,787	17,362	12,031	17,377	17,141	15,495
250-ACRE CASE	27,730	26,780	24,962	24,608	23,805	21,123	6,377	9,971	10,121	10,806
150-ACRE CASE	27,730	26,770	24,852	20,372	23,145	16,903	6,372	9,161	9,046	8,883
75-ACRE CASE	27,730	22,392	18,259	16,047	20,425	6,085	9,631	8,604	7,259	5,092
35-ACRE CASE	27,730	13,177	10,665	4,472	1,859	2,067	4,241	3,648	2,784	1,944

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	54,280	55,747	51,736	52,401	55,947	47,218	31,801	41,492	32,931	30,863
BASE CASE - 15% ROI	54,280	55,747	51,882	52,401	54,708	45,828	29,684	31,061	29,723	32,592
250-ACRE CASE	54,280	53,303	48,885	45,734	41,015	44,992	34,207	23,971	22,944	20,201
150-ACRE CASE	54,280	53,263	48,815	42,362	40,305	40,772	34,202	23,500	21,335	17,921
75-ACRE CASE	54,280	46,239	37,193	33,949	37,501	29,601	37,380	25,381	18,954	13,812
35-ACRE CASE	54,280	29,761	27,086	20,606	17,112	20,782	10,958	8,908	7,979	6,816

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	37,980	39,110	35,770	29,193	25,669	25,362	26,512	24,765	23,457	20,456
BASE CASE - 15% ROI	37,980	39,110	35,770	29,193	27,952	26,578	26,025	25,815	22,563	19,765
250-ACRE CASE	37,980	33,752	33,220	28,371	26,421	23,478	21,127	18,251	16,314	15,325
150-ACRE CASE	37,980	33,742	33,160	29,080	25,883	23,074	20,570	18,123	16,097	15,284
75-ACRE CASE	37,980	32,474	30,645	26,746	20,018	17,667	15,560	14,606	13,809	12,311
35-ACRE CASE	37,980	27,702	19,847	15,415	12,257	10,662	9,954	9,089	8,215	9,101

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	8,330	7,737	7,855	7,412	7,287	7,101	7,551	5,947	7,039	7,446
BASE CASE - 15% ROI	8,330	7,737	7,855	7,412	7,390	7,616	7,642	6,562	7,649	7,185
250-ACRE CASE	8,330	8,043	7,851	7,964	7,488	7,451	7,375	6,436	6,912	6,856
150-ACRE CASE	8,330	8,043	7,851	7,954	7,406	7,160	7,122	6,396	6,729	6,670
75-ACRE CASE	8,330	8,341	8,150	7,731	6,453	7,109	6,424	6,201	5,410	4,753
35-ACRE CASE	8,330	8,007	7,333	6,421	5,246	4,391	4,166	3,472	3,381	3,285

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	100,590	102,594	95,362	89,006	88,903	79,681	65,864	72,204	63,427	58,765
BASE CASE - 15% ROI	100,590	102,594	95,507	89,006	90,050	80,022	63,350	63,438	59,935	59,542
250-ACRE CASE	100,590	95,098	89,956	82,068	74,924	75,920	62,709	48,658	46,170	42,382
150-ACRE CASE	100,590	95,048	89,826	79,395	73,594	71,005	61,894	48,019	44,161	39,875
75-ACRE CASE	100,590	87,054	75,988	68,426	63,972	54,377	59,364	46,188	38,173	30,876
35-ACRE CASE	100,590	65,470	54,266	42,442	34,615	35,835	25,078	21,469	19,576	19,202

Table A-3

Total Tons - Deep Mines Only
ProductionTons (000)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	20,440	18,071	18,565	18,425	17,848	19,755	20,159	26,774	22,032	19,342
BASE CASE - 15% ROI	20,440	18,071	18,565	18,425	17,344	18,349	20,027	22,965	20,720	17,252
250-ACRE CASE	20,440	19,258	19,251	18,729	18,507	17,656	17,527	20,037	22,765	18,637
150-ACRE CASE	20,440	19,310	19,251	18,729	18,507	17,574	17,405	19,908	22,505	18,793
75-ACRE CASE	20,440	19,345	19,516	18,731	19,811	18,670	19,639	19,813	22,292	19,300
35-ACRE CASE	20,440	20,022	19,887	19,237	20,328	21,154	19,506	23,654	26,042	21,345
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 2										
BASE CASE - 10% ROI	29,630	27,714	29,405	32,626	28,974	20,603	23,511	24,552	16,835	13,172
BASE CASE - 15% ROI	29,630	27,714	29,255	32,617	27,973	20,940	23,497	22,741	16,604	17,486
250-ACRE CASE	29,630	27,119	27,703	29,602	31,123	24,415	21,613	24,646	19,841	16,229
150-ACRE CASE	29,630	27,119	27,703	29,807	31,191	24,416	21,803	23,727	18,324	15,783
75-ACRE CASE	29,630	27,170	28,544	30,485	32,960	27,200	24,030	22,429	16,249	18,208
35-ACRE CASE	29,630	27,991	29,263	33,231	35,542	29,339	26,704	23,626	17,070	14,385
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 3										
BASE CASE - 10% ROI	670	756	762	773	783	793	818	634	765	768
BASE CASE - 15% ROI	670	756	762	773	783	813	819	788	768	768
250-ACRE CASE	670	757	763	753	784	794	798	798	798	798
150-ACRE CASE	670	757	763	753	763	794	798	798	798	798
75-ACRE CASE	670	757	773	784	773	803	788	808	808	778
35-ACRE CASE	670	757	773	794	803	813	818	818	768	768
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 4										
BASE CASE - 10% ROI	10	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	10	0	0	0	0	0	0	0	0	0
250-ACRE CASE	10	0	0	0	0	0	0	0	0	0
150-ACRE CASE	10	0	0	0	0	0	0	0	0	0
75-ACRE CASE	10	0	0	0	0	0	0	0	0	0
35-ACRE CASE	10	0	0	0	0	0	0	0	0	0
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV C										
BASE CASE - 10% ROI	8,230	7,372	7,721	8,210	5,744	4,848	4,509	6,128	5,184	5,128
BASE CASE - 15% ROI	8,230	7,372	7,721	8,150	5,684	5,015	4,980	3,726	2,779	2,704
250-ACRE CASE	8,230	7,176	7,484	7,516	7,362	4,741	4,990	3,670	3,130	2,934
150-ACRE CASE	8,230	7,176	7,484	7,999	7,362	4,741	5,000	4,054	3,028	2,955
75-ACRE CASE	8,230	7,176	7,547	8,051	7,362	5,286	4,993	4,104	3,475	2,945
35-ACRE CASE	8,230	7,178	7,547	8,051	7,967	5,357	5,148	6,873	4,792	4,974
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV E										
BASE CASE - 10% ROI	260	267	278	288	298	308	319	329	339	349
BASE CASE - 15% ROI	260	267	278	288	298	308	319	329	339	349
250-ACRE CASE	260	267	278	288	298	308	319	329	339	349
150-ACRE CASE	260	267	278	288	298	308	319	329	339	349
75-ACRE CASE	260	267	278	288	298	308	319	329	339	349
35-ACRE CASE	260	267	278	288	298	308	319	329	340	349

Table A-3 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	33,600	37,844	42,114	44,496	46,693	47,987	46,869	46,114	41,053	42,423
BASE CASE - 15% ROI	33,600	37,844	42,114	44,496	46,693	47,987	46,869	44,370	40,451	40,983
250-ACRE CASE	33,600	34,474	38,647	42,936	45,345	46,987	46,567	42,801	42,281	40,914
150-ACRE CASE	33,600	34,474	38,647	42,936	45,345	46,987	46,567	42,801	42,281	40,914
75-ACRE CASE	33,600	34,474	38,647	42,936	47,325	49,022	48,984	44,352	43,574	42,475
35-ACRE CASE	33,600	34,474	38,647	42,936	47,325	49,822	49,822	46,919	44,810	39,001

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	4,540	4,189	3,353	1,521	1,138	768	768	694	164	164
BASE CASE - 15% ROI	4,540	4,189	3,353	1,521	1,138	768	768	694	164	164
250-ACRE CASE	4,540	4,189	3,020	1,139	818	768	768	664	164	164
150-ACRE CASE	4,540	4,189	3,020	1,139	818	768	768	344	164	164
75-ACRE CASE	4,540	4,189	3,365	1,553	1,191	841	862	883	903	924
35-ACRE CASE	4,540	4,191	3,099	905	214	164	170	170	170	170

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	33,460	31,711	28,221	29,293	33,698	36,219	38,532	46,281	41,681	36,705
BASE CASE - 15% ROI	33,460	31,711	28,221	29,273	33,894	32,961	34,864	38,644	33,589	31,274
250-ACRE CASE	33,460	32,020	28,364	27,026	27,857	33,181	31,683	32,558	32,232	36,046
150-ACRE CASE	33,460	32,020	28,364	27,026	27,907	33,182	34,872	35,492	35,206	36,668
75-ACRE CASE	33,460	32,625	28,995	27,674	30,671	34,423	43,068	31,225	34,179	35,922
35-ACRE CASE	33,460	32,713	29,418	28,525	31,804	38,418	41,365	41,452	42,409	42,209

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	80,090	81,384	81,687	83,807	87,571	90,131	90,997	99,546	88,421	84,770
BASE CASE - 15% ROI	80,090	81,384	81,687	83,727	87,707	87,040	87,800	87,763	77,321	75,474
250-ACRE CASE	80,090	78,127	77,793	78,905	81,680	85,985	84,327	80,022	78,147	80,407
150-ACRE CASE	80,090	78,127	77,793	79,387	81,730	85,987	87,526	83,020	81,018	81,050
75-ACRE CASE	80,090	78,732	78,831	80,502	86,847	89,881	98,226	80,893	82,470	82,614
35-ACRE CASE	80,090	78,825	78,988	80,704	87,608	94,070	96,824	95,743	92,520	86,703

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	50,750	46,541	48,733	51,823	47,604	41,151	44,488	51,960	39,633	33,283
BASE CASE - 15% ROI	50,750	46,541	48,583	51,814	46,101	40,102	44,342	46,494	38,092	35,505
250-ACRE CASE	50,750	47,133	47,718	49,085	50,414	42,865	39,938	45,480	43,404	35,664
150-ACRE CASE	50,750	47,185	47,718	49,290	50,462	42,783	40,006	44,432	41,626	35,374
75-ACRE CASE	50,750	47,271	48,833	49,999	53,543	46,673	44,457	43,050	39,348	38,285
35-ACRE CASE	50,750	48,769	49,922	53,262	56,673	51,305	47,027	48,098	43,880	36,498

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	18,870	20,295	21,922	21,213	15,599	16,165	17,112	16,265	14,022	14,808
BASE CASE - 15% ROI	18,870	20,295	21,922	21,104	15,624	16,314	17,491	16,561	14,842	15,886
250-ACRE CASE	18,870	18,419	19,792	22,016	19,695	15,569	17,328	17,382	15,262	15,873
150-ACRE CASE	18,870	18,419	19,792	22,078	19,985	15,867	17,646	17,376	15,232	15,446
75-ACRE CASE	18,870	18,461	20,347	22,411	20,237	16,442	18,667	18,068	16,325	17,613
35-ACRE CASE	18,870	18,768	20,389	22,757	20,786	17,025	19,923	20,315	17,919	18,800

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	149,710	148,220	152,341	156,843	150,775	147,447	152,596	167,771	142,077	132,861
BASE CASE - 15% ROI	149,710	148,220	152,191	156,645	149,431	143,455	149,633	150,819	130,256	126,865
250-ACRE CASE	149,710	143,679	145,302	150,005	151,788	144,420	141,592	142,885	136,813	131,945
150-ACRE CASE	149,710	143,731	145,302	150,755	152,177	144,637	145,177	144,828	137,877	131,869
75-ACRE CASE	149,710	144,464	148,012	152,912	160,627	152,996	161,349	142,011	138,143	138,512
35-ACRE CASE	149,710	146,363	149,300	156,723	165,067	162,400	163,774	164,156	154,319	142,001

Table B-1

Direct Coal Employment - (Number of Employees)
Base Case - 10% ROI

Region	Mining Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1608	1652	1640	1588	1758	1794	2383	1961	1716
KY_1	Surface	972	975	942	844	775	780	799	839	694	562
KY_1 Total		**2791**	**2583**	**2595**	**2484**	**2363**	**2538**	**2593**	**3222**	**2655**	**2278**
KY_2	Deep	2609	2467	2617	2904	2579	1834	2092	2185	1498	1167
KY_2	Surface	1102	1044	941	790	676	669	693	544	629	585
KY_2 Total		**3711**	**3511**	**3558**	**3693**	**3255**	**2503**	**2786**	**2729**	**2127**	**1752**
KY_3	Deep	60	67	68	69	70	71	73	56	68	68
KY_3	Surface	60	48	38	37	20	3	12	2	18	20
KY_3 Total		**120**	**116**	**106**	**106**	**89**	**74**	**85**	**58**	**87**	**88**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	8	3	0	0	0	0	0	0	2
KY_4 Total		**6**	**8**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
WV_C	Deep	724	656	687	731	511	431	393	543	453	447
WV_C	Surface	1322	1266	1284	1244	1314	1686	1091	990	420	493
WV_C Total		**2046**	**1922**	**1971**	**1974**	**1825**	**2118**	**1484**	**1533**	**872**	**940**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	17	17	18	14	19	19	20	32	32
WV_E Total		**55**	**41**	**42**	**44**	**41**	**46**	**47**	**49**	**62**	**63**
WV_N	Deep	2410	2701	2996	3162	3311	3405	3346	3328	2975	3069
WV_N	Surface	69	51	24	8	4	8	16	13	22	28
WV_N Total		**2479**	**2752**	**3020**	**3169**	**3316**	**3413**	**3362**	**3341**	**2997**	**3097**
WV_S	Deep	404	373	298	135	101	68	68	62	15	15
WV_S	Surface	71	72	64	19	20	21	21	22	22	23
WV_S Total		**475**	**445**	**362**	**155**	**121**	**89**	**90**	**84**	**37**	**38**
WV_SW	Deep	2732	2612	2374	2449	2805	3045	3339	4059	3709	3253
WV_SW	Surface	1405	1497	1404	1567	1758	954	669	1231	1273	1127
WV_SW Total		**4137**	**4109**	**3778**	**4017**	**4563**	**3999**	**4008**	**5291**	**4983**	**4380**
ALLEKY	Deep	4489	4142	4337	4612	4237	3662	3959	4624	3527	2951
ALLEKY	Surface	2139	2075	1925	1671	1470	1452	1504	1385	1341	1169
ALL E. KY Total		**6627**	**6217**	**6262**	**6283**	**5707**	**5114**	**5463**	**6009**	**4869**	**4120**
ALLWV	Deep	6293	6366	6380	6503	6756	6977	7175	8022	7182	6815
ALLWV	Surface	2899	2903	2793	2856	3110	2688	1817	2275	1769	1703
ALLWV Total		**9192**	**9269**	**9173**	**9359**	**9866**	**9665**	**8991**	**10297**	**8951**	**8518**
ALLVA	Deep	1538	1658	1795	1728	1225	1271	1351	1267	1063	1102
ALLVA	Surface	488	455	463	437	430	419	446	351	415	439
VA Total		**2026**	**2113**	**2259**	**2166**	**1654**	**1690**	**1796**	**1618**	**1478**	**1541**
ALLREG	Deep	12319	12166	12513	12843	12217	11910	12485	13914	11772	10868
ALLREG	Surface	5526	5434	5181	4965	5010	4559	3766	4011	3526	3311
ALLREG Total		**17845**	**17600**	**17694**	**17808**	**17227**	**16469**	**16251**	**17925**	**15298**	**14179**

Table B-2

Direct Coal Employment - (Number of Employees)
Base Case - 15% ROI

Region	Mining Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1608	1652	1640	1544	1633	1782	2044	1844	1535
KY_1	Surface	972	975	942	844	819	794	799	731	632	526
KY_1 Total		**2791**	**2583**	**2595**	**2484**	**2363**	**2427**	**2582**	**2775**	**2476**	**2061**
KY_2	Deep	2609	2467	2604	2903	2490	1864	2091	2024	1478	1556
KY_2	Surface	1102	1044	941	790	767	716	664	704	634	580
KY_2 Total		**3711**	**3511**	**3545**	**3693**	**3256**	**2580**	**2755**	**2728**	**2112**	**2136**
KY_3	Deep	60	67	68	69	70	72	73	70	68	68
KY_3	Surface	60	48	38	37	20	13	12	12	20	20
KY_3 Total		**120**	**116**	**106**	**106**	**89**	**85**	**85**	**82**	**88**	**88**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	8	3	0	0	0	0	0	2	2
KY_4 Total		**6**	**8**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
WV_C	Deep	724	656	687	725	506	438	434	329	238	231
WV_C	Surface	1322	1266	1292	1244	1216	1596	966	735	643	907
WV_C Total		**2046**	**1922**	**1980**	**1969**	**1722**	**2034**	**1400**	**1063**	**881**	**1138**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	17	17	18	18	19	19	20	32	32
WV_E Total		**55**	**41**	**42**	**44**	**45**	**46**	**47**	**49**	**62**	**63**
WV_N	Deep	2410	2701	2996	3162	3311	3405	3346	3191	2903	2941
WV_N	Surface	69	51	24	8	4	15	16	13	26	28
WV_N Total		**2479**	**2752**	**3020**	**3169**	**3316**	**3420**	**3362**	**3204**	**2930**	**2968**
WV_S	Deep	404	373	298	135	101	68	68	62	15	15
WV_S	Surface	71	72	64	19	20	21	21	22	22	23
WV_S Total		**475**	**445**	**362**	**155**	**121**	**89**	**90**	**84**	**37**	**38**
WV_SW	Deep	2732	2612	2374	2448	2823	2755	3013	3379	2982	2776
WV_SW	Surface	1405	1497	1404	1567	1779	955	669	908	894	848
WV_SW Total		**4137**	**4109**	**3778**	**4015**	**4601**	**3710**	**3682**	**4288**	**3877**	**3624**
ALLEKY	Deep	4489	4142	4324	4611	4103	3569	3946	4138	3390	3160
ALLEKY	Surface	2139	2075	1925	1671	1605	1524	1475	1447	1288	1128
ALL E. KY Total		**6627**	**6217**	**6249**	**6283**	**5708**	**5093**	**5422**	**5585**	**4679**	**4288**
ALLWV	Deep	6293	6366	6380	6495	6768	6693	6890	6990	6169	5994
ALLWV	Surface	2899	2903	2802	2856	3037	2606	1692	1697	1618	1838
ALLWV Total		**9192**	**9269**	**9182**	**9352**	**9805**	**9299**	**8582**	**8687**	**7787**	**7832**
ALLVA	Deep	1538	1658	1795	1719	1227	1284	1384	1294	1136	1224
ALLVA	Surface	488	455	463	437	436	449	451	387	451	424
ALLVA Total		**2026**	**2113**	**2259**	**2156**	**1663**	**1733**	**1835**	**1681**	**1587**	**1648**
ALLREG	Deep	12319	12166	12499	12825	12098	11547	12221	12422	10695	10378
ALLREG	Surface	5526	5434	5190	4965	5078	4579	3618	3531	3358	3390
ALLREG Total		**17845**	**17600**	**17689**	**17790**	**17176**	**16125**	**15838**	**15952**	**14052**	**13767**

Table B-3

Direct Coal Employment - (Number of Employees)
250-Acre Case

Region	Mining Ty	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1714	1713	1667	1647	1571	1560	1783	2026	1659
KY_1	Surface	972	944	895	840	779	770	667	558	482	433
KY_1 Total		**2791**	**2657**	**2608**	**2507**	**2427**	**2341**	**2227**	**2342**	**2508**	**2092**
KY_2	Deep	2609	2414	2466	2635	2770	2173	1924	2193	1766	1444
KY_2	Surface	1102	887	829	747	743	603	556	495	452	449
KY_2 Total		**3711**	**3300**	**3295**	**3382**	**3513**	**2776**	**2480**	**2689**	**2218**	**1893**
KY_3	Deep	60	67	68	67	70	71	71	71	71	71
KY_3	Surface	60	56	47	36	18	2	12	12	20	20
KY_3 Total		**120**	**124**	**114**	**103**	**87**	**72**	**83**	**83**	**91**	**91**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	5	6	0	0	0	0	0	2	2
KY_4 Total		**6**	**5**	**6**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
WV_C	Deep	724	630	658	669	655	422	435	324	275	251
WV_C	Surface	1322	1343	1311	1175	965	1358	1589	785	702	485
WV_C Total		**2046**	**1973**	**1969**	**1844**	**1621**	**1780**	**2024**	**1108**	**977**	**736**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	29	17	18	18	19	19	20	32	32
WV_E Total		**55**	**53**	**42**	**44**	**45**	**46**	**47**	**49**	**62**	**63**
WV_N	Deep	2410	2471	2759	3054	3222	3337	3310	3069	3019	2921
WV_N	Surface	69	59	16	11	8	8	16	13	14	27
WV_N Total		**2479**	**2530**	**2775**	**3065**	**3230**	**3345**	**3326**	**3081**	**3033**	**2949**
WV_S	Deep	404	373	269	101	73	68	68	59	15	15
WV_S	Surface	71	62	11	1	1	1	1	1	1	1
WV_S Total		**475**	**435**	**280**	**103**	**74**	**70**	**70**	**60**	**16**	**16**
WV_SW	Deep	2732	2633	2381	2261	2321	2764	2682	2836	2865	3202
WV_SW	Surface	1405	1347	1265	1277	1282	1138	342	534	543	596
WV_SW Total		**4137**	**3980**	**3646**	**3537**	**3603**	**3902**	**3023**	**3370**	**3408**	**3798**
ALLEKY	Deep	4489	4195	4247	4369	4487	3815	3554	4048	3863	3174
ALLEKY	Surface	2139	1891	1776	1623	1540	1374	1235	1066	956	904
ALL E. KY Total		**6627**	**6086**	**6023**	**5991**	**6027**	**5189**	**4790**	**5114**	**4819**	**4078**
ALLWV	Deep	6293	6130	6091	6111	6297	6620	6523	6317	6203	6421
ALLWV	Surface	2899	2840	2621	2481	2275	2524	1968	1352	1292	1142
ALLWV Total		**9192**	**8970**	**8712**	**8592**	**8572**	**9144**	**8491**	**7669**	**7495**	**7563**
ALLVA	Deep	1538	1491	1606	1796	1586	1214	1366	1363	1169	1219
ALLVA	Surface	488	473	463	470	442	440	435	380	408	404
ALLVA Total		**2026**	**1964**	**2069**	**2266**	**2027**	**1654**	**1801**	**1743**	**1577**	**1623**
ALLREG	Deep	12319	11816	11944	12276	12370	11649	11444	11727	11236	10813
ALLREG	Surface	5526	5205	4861	4574	4257	4338	3638	2798	2656	2451
ALLREG Total		**17845**	**17021**	**16804**	**16849**	**16627**	**15986**	**15082**	**14525**	**13891**	**13264**

Table B-4

Direct Coal Employment - (Number of Employees)
150-Acre Case

Region	Mining Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1719	1713	1667	1647	1564	1549	1772	2003	1673
KY_1	Surface	972	943	895	839	773	767	661	555	480	431
KY_1 Total		**2791**	**2661**	**2608**	**2506**	**2420**	**2332**	**2210**	**2327**	**2482**	**2103**
KY_2	Deep	2609	2414	2466	2653	2776	2173	1940	2112	1631	1405
KY_2	Surface	1102	887	829	782	718	571	529	485	442	445
KY_2 Total		**3711**	**3300**	**3294**	**3435**	**3494**	**2744**	**2469**	**2596**	**2073**	**1849**
KY_3	Deep	60	67	68	67	68	71	71	71	71	71
KY_3	Surface	60	56	47	46	18	12	12	19	20	24
KY_3 Total		**120**	**124**	**114**	**113**	**86**	**83**	**83**	**90**	**91**	**95**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	5	5	0	0	0	0	0	2	2
KY_4 Total		**6**	**5**	**5**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
WV_C	Deep	724	630	658	704	655	422	436	351	268	253
WV_C	Surface	1322	1343	1311	1222	963	1358	1589	805	675	464
WV_C Total		**2046**	**1973**	**1969**	**1925**	**1619**	**1780**	**2025**	**1156**	**943**	**717**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	29	17	18	18	19	19	20	28	32
WV_E Total		**55**	**53**	**42**	**44**	**45**	**46**	**47**	**49**	**58**	**63**
WV_N	Deep	2410	2471	2759	3054	3222	3337	3310	3069	3019	2921
WV_N	Surface	69	55	16	15	8	8	16	13	13	27
WV_N Total		**2479**	**2526**	**2775**	**3069**	**3230**	**3345**	**3326**	**3081**	**3031**	**2949**
WV_S	Deep	404	373	269	101	73	68	68	31	15	15
WV_S	Surface	71	66	14	1	1	1	1	1	1	1
WV_S Total		**475**	**439**	**282**	**103**	**74**	**70**	**70**	**32**	**16**	**16**
WV_SW	Deep	2732	2633	2381	2261	2325	2764	2965	3097	3133	3254
WV_SW	Surface	1405	1347	1261	1067	1248	910	342	491	489	488
WV_SW Total		**4137**	**3980**	**3641**	**3327**	**3573**	**3675**	**3307**	**3588**	**3622**	**3741**
ALLEKY	Deep	4489	4199	4247	4387	4491	3808	3561	3954	3705	3148
ALLEKY	Surface	2139	1891	1775	1667	1509	1350	1203	1058	944	902
ALL E. KY Total		**6627**	**6090**	**6022**	**6054**	**6000**	**5158**	**4763**	**5013**	**4649**	**4050**
ALLWV	Deep	6293	6130	6091	6145	6302	6620	6808	6577	6465	6473
ALLWV	Surface	2899	2840	2619	2323	2239	2296	1967	1329	1206	1013
ALLWV Total		**9192**	**8970**	**8710**	**8468**	**8540**	**8916**	**8775**	**7906**	**7670**	**7486**
ALLVA	Deep	1538	1491	1606	1802	1608	1237	1391	1362	1166	1181
ALLVA	Surface	488	473	463	469	437	422	420	377	397	394
ALLVA Total		**2026**	**1964**	**2069**	**2271**	**2045**	**1660**	**1811**	**1739**	**1563**	**1574**
ALLREG	Deep	12319	11821	11944	12334	12401	11665	11759	11894	11336	10802
ALLREG	Surface	5526	5204	4857	4459	4185	4069	3590	2764	2547	2308
ALLREG Total		**17845**	**17025**	**16801**	**16793**	**16586**	**15733**	**15349**	**14658**	**13882**	**13110**

Table B-5

Direct Coal Employment - (Number of Employees)
75-Acre Case

Region	Mining Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1722	1737	1667	1763	1662	1748	1763	1984	1718
KY_1	Surface	972	881	820	753	583	449	402	360	295	226
KY_1 Total		**2791**	**2602**	**2557**	**2420**	**2346**	**2111**	**2150**	**2123**	**2279**	**1944**
KY_2	Deep	2609	2418	2540	2713	2933	2421	2139	1996	1446	1620
KY_2	Surface	1102	878	816	760	566	575	504	483	498	474
KY_2 Total		**3711**	**3296**	**3357**	**3473**	**3500**	**2996**	**2642**	**2479**	**1944**	**2094**
KY_3	Deep	60	67	69	70	69	71	70	72	72	69
KY_3	Surface	60	56	53	46	18	12	12	19	20	24
KY_3 Total		**120**	**124**	**122**	**116**	**87**	**83**	**82**	**91**	**92**	**93**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	5	2	0	0	0	0	0	2	2
KY_4 Total		**6**	**5**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
WV_C	Deep	724	630	663	707	655	461	437	356	299	252
WV_C	Surface	1322	1223	1029	977	934	1299	1563	918	601	412
WV_C Total		**2046**	**1853**	**1692**	**1684**	**1590**	**1760**	**2000**	**1273**	**900**	**664**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	29	26	18	18	19	19	20	32	32
WV_E Total		**55**	**53**	**51**	**44**	**45**	**46**	**47**	**49**	**62**	**63**
WV_N	Deep	2410	2471	2759	3054	3356	3476	3476	3162	3093	3012
WV_N	Surface	69	42	16	16	5	16	8	13	16	28
WV_N Total		**2479**	**2513**	**2775**	**3071**	**3362**	**3492**	**3484**	**3174**	**3109**	**3040**
WV_S	Deep	404	373	299	138	106	75	77	79	80	82
WV_S	Surface	71	62	20	19	20	21	21	22	22	23
WV_S Total		**475**	**435**	**319**	**158**	**126**	**95**	**98**	**100**	**103**	**105**
WV_SW	Deep	2732	2681	2431	2318	2578	2875	3639	2779	3029	3184
WV_SW	Surface	1405	1134	936	866	1098	326	525	465	385	267
WV_SW Total		**4137**	**3815**	**3367**	**3183**	**3676**	**3201**	**4165**	**3244**	**3414**	**3451**
ALLEKY	Deep	4489	4207	4346	4450	4765	4154	3957	3831	3502	3407
ALLEKY	Surface	2139	1820	1691	1559	1167	1036	918	862	815	726
ALL E. KY Total		**6627**	**6027**	**6038**	**6009**	**5933**	**5190**	**4875**	**4693**	**4317**	**4134**
ALLWV	Deep	6293	6179	6176	6243	6722	6914	7658	6404	6531	6561
ALLWV	Surface	2899	2490	2027	1896	2077	1681	2137	1436	1056	763
ALLWV Total		**9192**	**8669**	**8204**	**8139**	**8798**	**8595**	**9795**	**7840**	**7588**	**7324**
ALLVA	Deep	1538	1495	1655	1832	1630	1288	1478	1420	1260	1370
ALLVA	Surface	488	492	481	456	381	419	379	366	319	280
ALLVA Total		**2026**	**1987**	**2136**	**2288**	**2011**	**1708**	**1857**	**1786**	**1579**	**1650**
ALLREG	Deep	12319	11880	12178	12525	13118	12356	13093	11656	11293	11338
ALLREG	Surface	5526	4802	4200	3911	3625	3136	3434	2664	2190	1769
ALLREG Total		**17845**	**16683**	**16377**	**16436**	**16742**	**15492**	**16527**	**14319**	**13483**	**13108**

Table B-6

Direct Coal Employment - (Number of Employees)
35-Acre Case

Region	Mining Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY_1	Deep	1819	1782	1770	1712	1809	1883	1736	2105	2318	1900
KY_1	Surface	972	751	435	349	241	199	185	147	93	100
KY_1 Total		**2791**	**2533**	**2205**	**2061**	**2050**	**2081**	**1921**	**2252**	**2411**	**1999**
KY_2	Deep	2609	2491	2604	2958	3163	2611	2377	2103	1519	1280
KY_2	Surface	1102	773	668	521	465	413	381	375	381	422
KY_2 Total		**3711**	**3264**	**3273**	**3478**	**3628**	**3024**	**2758**	**2477**	**1900**	**1703**
KY_3	Deep	60	67	69	71	72	72	73	73	68	68
KY_3	Surface	60	54	53	37	17	17	19	15	8	13
KY_3 Total		**120**	**121**	**122**	**108**	**89**	**90**	**91**	**88**	**77**	**81**
KY_4	Deep	1	0	0	0	0	0	0	0	0	0
KY_4	Surface	5	3	2	2	0	0	2	0	2	2
KY_4 Total		**6**	**3**	**2**	**2**	**0**	**0**	**2**	**0**	**2**	**2**
WV_C	Deep	724	630	663	707	700	467	448	608	423	431
WV_C	Surface	1322	889	888	874	828	1035	332	249	239	208
WV_C Total		**2046**	**1519**	**1551**	**1582**	**1528**	**1502**	**780**	**857**	**662**	**639**
WV_E	Deep	23	24	25	26	27	27	28	29	30	31
WV_E	Surface	31	29	30	26	18	18	18	18	26	25
WV_E Total		**55**	**53**	**54**	**52**	**45**	**45**	**46**	**47**	**56**	**56**
WV_N	Deep	2410	2471	2759	3054	3356	3530	3534	3350	3188	2791
WV_N	Surface	69	28	18	16	15	16	16	15	13	27
WV_N Total		**2479**	**2499**	**2776**	**3071**	**3372**	**3547**	**3550**	**3366**	**3201**	**2819**
WV_S	Deep	404	373	276	81	19	15	15	15	15	15
WV_S	Surface	71	18	19	19	20	21	21	22	22	23
WV_S Total		**475**	**391**	**295**	**100**	**39**	**35**	**36**	**36**	**37**	**38**
WV_SW	Deep	2732	2688	2468	2385	2669	3194	3521	3688	3766	3743
WV_SW	Surface	1405	713	573	227	99	122	240	186	138	92
WV_SW Total		**4137**	**3401**	**3041**	**2612**	**2768**	**3316**	**3761**	**3874**	**3904**	**3836**
ALLEKY	Deep	4489	4340	4443	4740	5044	4566	4185	4281	3905	3248
ALLEKY	Surface	2139	1580	1159	909	723	629	587	536	485	537
ALL E. KY Total		**6627**	**5921**	**5602**	**5650**	**5767**	**5195**	**4773**	**4817**	**4390**	**3785**
ALLWV	Deep	6293	6186	6190	6253	6771	7233	7546	7690	7422	7011
ALLWV	Surface	2899	1677	1527	1164	981	1211	628	490	438	376
ALLWV Total		**9192**	**7863**	**7717**	**7416**	**7751**	**8445**	**8174**	**8180**	**7860**	**7387**
ALLVA	Deep	1538	1522	1659	1862	1679	1337	1587	1613	1395	1468
ALLVA	Surface	488	472	433	379	309	259	246	205	199	194
ALLVA Total		**2026**	**1994**	**2092**	**2241**	**1989**	**1596**	**1832**	**1818**	**1595**	**1662**
ALLREG	Deep	12319	12048	12292	12855	13494	13136	13318	13584	12723	11728
ALLREG	Surface	5526	3730	3118	2452	2013	2100	1461	1231	1122	1107
ALLREG Total		**17845**	**15778**	**15410**	**15307**	**15507**	**15236**	**14779**	**14815**	**13844**	**12834**

Table C-1

Mine Capacity Capital Expenditures
Million Dollars

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	0.00	33.33	13.01	0.18	11.34	17.59	1.05	178.48	0.00	0.00
BASE CASE - 15% ROI	0.00	33.33	13.01	0.18	0.17	0.43	31.01	70.50	0.00	0.00
250-ACRE CASE	0.00	5.09	27.10	0.00	3.77	0.00	0.00	51.85	47.09	0.00
150-ACRE CASE	0.00	4.95	27.03	0.00	3.77	0.00	0.00	51.70	49.09	0.00
75-ACRE CASE	0.00	2.72	16.12	0.00	31.42	0.00	31.30	1.63	31.66	0.00
35-ACRE CASE	0.00	2.49	9.42	0.00	25.60	16.45	0.00	99.52	40.68	0.33

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 2										
BASE CASE - 10% ROI	0.00	67.08	45.89	68.35	0.70	0.70	39.17	79.52	0.00	0.00
BASE CASE - 15% ROI	0.00	67.08	42.89	71.18	0.70	0.70	53.53	21.67	0.00	21.12
250-ACRE CASE	0.00	12.60	34.51	54.21	38.50	0.00	0.00	68.61	0.00	0.00
150-ACRE CASE	0.00	12.60	34.30	54.21	39.96	0.00	0.00	31.92	0.00	0.00
75-ACRE CASE	0.00	12.30	33.19	54.52	80.17	0.00	0.00	0.00	1.08	39.18
35-ACRE CASE	0.00	12.29	31.83	79.48	59.95	0.00	0.00	0.00	1.50	0.00

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 3										
BASE CASE - 10% ROI	0.00	0.79	0.11	0.21	0.20	0.21	0.10	0.05	0.00	0.14
BASE CASE - 15% ROI	0.00	0.79	0.11	0.21	0.20	0.21	0.10	0.00	0.00	0.04
250-ACRE CASE	0.00	0.39	0.13	0.21	0.20	0.21	0.08	0.05	0.00	0.04
150-ACRE CASE	0.00	0.39	0.13	0.21	0.20	0.21	0.14	0.00	0.03	0.01
75-ACRE CASE	0.00	0.39	0.33	0.21	0.19	0.20	0.14	0.00	0.03	0.01
35-ACRE CASE	0.00	0.34	0.33	0.41	0.19	0.20	0.10	0.00	0.00	0.00

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 4										
BASE CASE - 10% ROI	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BASE CASE - 15% ROI	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
250-ACRE CASE	0.00	0.02	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.01
150-ACRE CASE	0.00	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.01
75-ACRE CASE	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
35-ACRE CASE	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV C										
BASE CASE - 10% ROI	0.00	8.37	11.56	14.41	88.19	83.51	0.18	68.97	0.42	0.40
BASE CASE - 15% ROI	0.00	8.37	11.56	13.29	65.01	70.13	0.43	0.43	0.42	62.96
250-ACRE CASE	0.00	7.17	12.15	14.47	4.65	96.36	40.28	0.27	0.26	0.49
150-ACRE CASE	0.00	7.17	12.15	14.47	5.13	96.42	40.28	0.27	0.52	0.48
75-ACRE CASE	0.00	6.69	12.04	10.45	12.14	70.47	66.64	0.69	0.68	0.66
35-ACRE CASE	0.00	0.66	7.55	10.27	0.97	53.47	0.52	43.08	0.52	0.48

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV E										
BASE CASE - 10% ROI	0.00	0.42	0.38	0.38	0.38	0.38	0.40	0.38	0.38	0.40
BASE CASE - 15% ROI	0.00	0.42	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.40
250-ACRE CASE	0.00	0.42	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.40
150-ACRE CASE	0.00	0.42	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
75-ACRE CASE	0.00	0.42	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.40
35-ACRE CASE	0.00	0.42	0.38	0.38	0.27	0.20	0.21	0.21	0.21	0.22

Table C-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	0.00	145.99	144.44	78.27	77.52	37.61	22.30	43.74	0.00	46.66
BASE CASE - 15% ROI	0.00	145.99	144.44	78.27	77.52	37.61	22.33	14.31	0.00	16.93
250-ACRE CASE	0.00	30.85	141.15	145.22	79.27	52.32	1.60	20.54	7.07	3.92
150-ACRE CASE	0.00	30.85	141.15	145.22	79.27	52.32	1.60	20.54	7.07	3.92
75-ACRE CASE	0.00	30.85	141.15	145.22	148.57	54.27	9.75	0.48	9.25	5.89
35-ACRE CASE	0.00	30.85	141.15	145.22	148.57	82.27	10.32	19.76	0.00	0.03

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	0.00	0.19	0.00	0.00	0.14	0.14	0.14	0.14	0.14	0.14
BASE CASE - 15% ROI	0.00	0.19	0.00	0.00	0.14	0.14	0.14	0.14	0.14	0.14
250-ACRE CASE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150-ACRE CASE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75-ACRE CASE	0.00	0.00	0.00	0.00	0.14	0.14	0.55	0.55	0.55	0.55
35-ACRE CASE	0.00	0.00	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	0.00	55.12	12.82	102.78	219.00	61.61	126.88	416.55	1.61	1.35
BASE CASE - 15% ROI	0.00	55.12	12.82	102.38	218.00	5.09	124.58	199.99	0.41	14.99
250-ACRE CASE	0.00	11.35	27.14	49.37	75.72	128.16	11.14	146.14	49.47	83.45
150-ACRE CASE	0.00	11.35	26.45	13.86	105.64	128.05	81.88	123.36	54.70	14.43
75-ACRE CASE	0.00	9.84	3.65	48.59	147.83	88.42	241.63	0.32	39.85	34.75
35-ACRE CASE	0.00	8.70	15.00	6.80	82.94	188.29	148.55	179.12	12.82	0.17

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	0.00	210.09	169.20	195.84	385.23	183.25	149.90	529.78	2.55	48.95
BASE CASE - 15% ROI	0.00	210.09	169.20	194.32	361.05	113.35	147.86	215.25	1.35	95.42
250-ACRE CASE	0.00	49.79	180.82	209.44	160.02	277.22	53.40	167.33	57.18	88.26
150-ACRE CASE	0.00	49.79	180.13	173.93	190.42	277.17	124.14	144.55	62.67	19.21
75-ACRE CASE	0.00	47.80	157.22	204.64	309.06	213.68	318.95	2.42	50.71	42.25
35-ACRE CASE	0.00	40.63	164.23	162.81	232.89	324.37	159.74	242.31	13.69	1.04

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	0.00	101.94	59.01	68.74	12.24	18.50	40.32	258.05	0.00	0.14
BASE CASE - 15% ROI	0.00	101.94	56.01	71.57	1.07	1.34	84.64	92.17	0.00	21.17
250-ACRE CASE	0.00	18.10	62.19	54.42	42.47	0.21	0.08	120.51	47.09	0.05
150-ACRE CASE	0.00	17.96	61.82	54.42	43.93	0.21	0.14	83.62	49.12	0.02
75-ACRE CASE	0.00	15.43	49.64	54.73	111.78	0.20	31.44	1.63	32.77	39.20
35-ACRE CASE	0.00	15.14	41.58	79.89	85.74	16.65	0.10	99.53	42.18	0.34

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	0.00	67.73	40.88	8.33	6.82	7.06	12.51	13.15	8.05	7.90
BASE CASE - 15% ROI	0.00	67.73	40.88	8.33	6.82	7.05	24.56	13.15	8.53	24.27
250-ACRE CASE	0.00	19.34	44.45	53.69	6.97	7.18	30.75	13.50	8.05	9.58
150-ACRE CASE	0.00	19.34	44.45	53.55	12.57	7.33	31.31	7.90	8.02	8.26
75-ACRE CASE	0.00	19.35	45.70	52.59	12.57	7.33	59.92	8.05	8.26	23.08
35-ACRE CASE	0.00	16.77	43.94	53.49	12.57	12.93	63.21	14.30	8.40	14.67

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	0.00	379.76	269.09	272.91	404.29	208.81	202.73	800.98	10.60	56.99
BASE CASE - 15% ROI	0.00	379.76	266.09	274.22	368.94	121.74	257.06	320.57	9.88	140.86
250-ACRE CASE	0.00	87.23	287.46	317.55	209.46	284.61	84.23	301.34	112.32	97.89
150-ACRE CASE	0.00	87.09	286.40	281.90	246.92	284.71	155.59	236.07	119.81	27.49
75-ACRE CASE	0.00	82.58	252.56	311.96	433.41	221.21	410.31	12.10	91.74	104.53
35-ACRE CASE	0.00	72.54	249.75	296.19	331.20	353.95	223.05	356.14	64.27	16.05

Table D-1

Average Coal Prices
(Constant 2001 Dollars per Ton, Fob Mine)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	35.22	25.49	25.06	24.73	23.57	23.78	25.24	22.47	23.79	25.77
BASE CASE - 15% ROI	35.22	25.49	25.05	24.74	24.02	24.76	25.27	23.68	25.53	25.11
250-ACRE CASE	35.22	27.22	25.87	25.31	24.81	24.39	25.14	24.52	25.08	26.45
150-ACRE CASE	35.22	27.22	25.88	25.51	24.80	24.37	25.02	24.60	24.63	26.53
75-ACRE CASE	35.22	27.63	26.70	26.14	24.38	25.64	24.29	24.74	25.89	26.54
35-ACRE CASE	35.22	29.23	27.73	27.37	26.20	25.72	26.36	24.99	25.12	26.71

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 2										
BASE CASE - 10% ROI	35.02	25.27	24.70	24.13	23.02	23.54	24.77	22.30	23.81	25.50
BASE CASE - 15% ROI	35.02	25.27	24.70	24.15	23.44	24.49	24.79	23.38	25.37	24.64
250-ACRE CASE	35.02	27.00	25.44	24.67	24.14	23.86	24.83	24.15	24.80	26.17
150-ACRE CASE	35.02	27.00	25.44	24.83	24.13	23.87	24.68	24.30	24.58	26.24
75-ACRE CASE	35.02	27.36	26.21	25.40	23.79	25.17	23.97	24.45	25.71	26.07
35-ACRE CASE	35.02	28.87	27.25	26.74	25.61	25.20	25.81	24.71	25.11	26.47

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 3										
BASE CASE - 10% ROI	34.27	24.31	23.73	24.18	21.44	23.62	22.95	19.44	21.69	23.40
BASE CASE - 15% ROI	34.27	24.31	24.82	22.89	21.84	22.69	23.07	23.25	23.39	22.70
250-ACRE CASE	34.27	26.19	24.65	23.49	22.73	21.85	23.05	21.62	23.07	24.00
150-ACRE CASE	34.27	26.19	24.65	23.74	22.69	22.18	22.88	23.94	22.20	24.01
75-ACRE CASE	34.27	26.63	25.44	25.20	22.27	24.65	22.03	23.98	23.88	23.81
35-ACRE CASE	34.27	28.39	26.47	25.53	24.12	23.54	24.07	22.23	22.00	26.08

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 4										
BASE CASE - 10% ROI	34.88	25.17	24.30	0.00	0.00	0.00	0.00	0.00	0.00	25.57
BASE CASE - 15% ROI	34.88	25.17	24.29	0.00	0.00	0.00	0.00	0.00	25.46	24.58
250-ACRE CASE	34.88	26.85	25.01	0.00	0.00	0.00	0.00	0.00	24.75	26.03
150-ACRE CASE	34.88	26.85	25.02	0.00	0.00	0.00	0.00	0.00	24.53	26.17
75-ACRE CASE	34.88	27.16	25.78	0.00	0.00	0.00	0.00	0.00	25.63	26.08
35-ACRE CASE	34.88	28.54	26.85	26.07	0.00	0.00	25.35	0.00	25.19	26.50

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV C										
BASE CASE - 10% ROI	34.75	25.38	25.10	24.56	23.58	23.51	24.78	21.23	22.59	24.54
BASE CASE - 15% ROI	34.75	25.38	25.09	24.57	23.95	24.49	24.94	22.42	24.09	23.77
250-ACRE CASE	34.75	26.96	25.97	25.19	24.73	24.16	24.72	23.32	23.70	25.03
150-ACRE CASE	34.75	26.96	25.97	25.46	24.70	24.13	24.63	23.44	23.20	25.04
75-ACRE CASE	34.75	27.54	26.91	26.22	24.37	25.56	23.75	23.53	24.29	24.96
35-ACRE CASE	34.75	29.27	27.79	27.29	25.82	25.32	25.81	23.81	23.69	25.29

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV E										
BASE CASE - 10% ROI	35.77	26.11	24.81	23.40	22.24	22.54	23.24	22.52	24.10	25.99
BASE CASE - 15% ROI	35.77	26.11	24.81	23.40	22.48	22.97	23.17	23.06	24.97	25.72
250-ACRE CASE	35.77	27.61	25.57	23.62	23.04	22.58	23.13	23.38	23.60	26.21
150-ACRE CASE	35.77	27.62	25.58	23.87	23.07	22.57	23.17	23.48	23.29	25.87
75-ACRE CASE	35.77	27.95	26.01	24.37	22.97	23.30	22.28	23.38	23.87	25.44
35-ACRE CASE	35.77	29.50	26.58	25.40	23.85	23.22	23.53	23.26	23.22	26.42

Table D-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	34.91	24.92	23.33	22.66	21.78	22.03	22.71	21.42	22.95	24.46
BASE CASE - 15% ROI	34.91	24.92	23.33	22.66	22.03	22.44	22.64	21.96	23.80	24.21
250-ACRE CASE	34.91	26.55	24.38	22.86	22.56	22.14	22.68	22.29	22.70	24.88
150-ACRE CASE	34.91	26.56	24.39	23.10	22.60	22.15	22.73	22.38	22.40	24.46
75-ACRE CASE	34.91	26.79	24.81	23.71	22.42	22.67	21.82	22.25	22.79	23.85
35-ACRE CASE	34.91	28.22	25.28	24.65	23.08	22.54	22.99	22.20	22.30	24.40

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	34.22	24.84	24.70	24.50	23.13	23.37	24.91	21.28	22.54	24.55
BASE CASE - 15% ROI	34.22	24.84	24.69	24.50	23.56	24.30	24.87	22.49	24.24	23.88
250-ACRE CASE	34.22	26.39	24.99	24.50	23.86	23.51	24.49	23.23	23.70	24.52
150-ACRE CASE	34.22	26.41	25.03	24.75	23.82	23.47	24.41	23.16	23.18	24.63
75-ACRE CASE	34.22	26.91	25.78	25.75	23.97	25.41	23.97	23.65	24.35	24.94
35-ACRE CASE	34.22	28.15	26.72	27.21	26.12	25.55	26.16	24.05	23.94	25.24

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	34.09	24.68	24.39	23.98	22.57	22.90	24.31	21.03	22.32	24.29
BASE CASE - 15% ROI	34.09	24.68	24.39	23.99	22.99	23.88	24.48	22.27	24.05	23.65
250-ACRE CASE	34.09	26.31	25.21	24.46	23.82	23.32	24.34	23.21	23.86	24.84
150-ACRE CASE	34.09	26.31	25.21	24.69	23.77	23.34	24.10	23.32	23.33	24.93
75-ACRE CASE	34.09	26.84	26.01	25.38	23.41	24.88	23.31	23.55	24.40	24.85
35-ACRE CASE	34.09	28.39	26.89	26.75	25.34	24.79	25.21	23.82	23.76	25.03

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	34.48	24.91	24.23	23.68	22.52	22.75	23.78	21.20	22.58	24.40
BASE CASE - 15% ROI	34.48	24.91	24.22	23.68	22.86	23.50	23.82	22.18	23.97	23.91
250-ACRE CASE	34.48	26.54	25.13	24.07	23.53	23.07	23.78	22.85	23.35	24.89
150-ACRE CASE	34.48	26.54	25.14	24.31	23.51	23.07	23.71	22.96	22.92	24.76
75-ACRE CASE	34.48	26.99	25.80	24.93	23.22	24.12	22.87	23.00	23.68	24.43
35-ACRE CASE	34.48	28.51	26.49	25.97	24.41	23.91	24.23	23.09	23.09	24.80

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	35.09	25.35	24.84	24.38	23.23	23.66	24.97	22.37	23.77	25.60
BASE CASE - 15% ROI	35.09	25.35	24.85	24.37	23.66	24.59	25.00	23.53	25.42	24.82
250-ACRE CASE	35.09	27.08	25.62	24.93	24.40	24.08	24.95	24.28	24.92	26.26
150-ACRE CASE	35.09	27.08	25.62	25.10	24.39	24.08	24.81	24.43	24.56	26.33
75-ACRE CASE	35.09	27.47	26.41	25.70	24.01	25.35	24.08	24.57	25.76	26.23
35-ACRE CASE	35.09	29.02	27.42	26.95	25.79	25.38	25.99	24.79	25.06	26.58

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	36.44	27.17	26.64	26.09	25.00	25.40	26.75	23.23	24.64	26.73
BASE CASE - 15% ROI	36.44	27.17	26.64	26.10	25.43	26.31	26.95	24.48	26.56	26.14
250-ACRE CASE	36.44	28.92	27.52	26.53	25.89	25.77	26.78	25.48	26.38	25.15
150-ACRE CASE	36.44	28.92	27.53	26.78	25.85	25.74	26.56	25.61	23.76	25.66
75-ACRE CASE	36.44	29.56	28.28	27.39	25.62	27.24	25.66	26.08	27.01	25.11
35-ACRE CASE	36.44	31.03	29.21	28.52	27.69	27.31	27.60	24.88	24.05	25.31

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	34.91	25.31	24.73	24.19	22.97	23.29	24.50	21.76	23.15	25.01
BASE CASE - 15% ROI	34.91	25.31	24.73	24.19	23.35	24.13	24.58	22.88	24.74	24.45
250-ACRE CASE	34.91	26.99	25.58	24.67	24.11	23.66	24.49	23.65	24.23	25.33
150-ACRE CASE	34.91	26.99	25.59	24.90	24.09	23.66	24.37	23.77	23.54	25.34
75-ACRE CASE	34.91	27.45	26.33	25.53	23.76	24.86	23.52	23.88	24.72	25.06
35-ACRE CASE	34.91	29.01	27.18	26.68	25.31	24.73	25.19	23.84	23.80	25.38

Table E-1

Megawatt-Hours of Generation

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 2										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 3										
BASE CASE - 10% ROI	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634
BASE CASE - 15% ROI	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634
250-ACRE CASE	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634
150-ACRE CASE	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634
75-ACRE CASE	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634
35-ACRE CASE	2,123,435	2,128,837	2,134,238	2,139,640	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 4										
BASE CASE - 10% ROI	323,925	374,160	424,395	474,629	423,534	447,754	461,457	0	0	0
BASE CASE - 15% ROI	323,925	374,160	424,395	474,629	423,534	447,754	461,457	0	0	0
250-ACRE CASE	323,925	374,160	424,395	474,629	423,534	447,754	0	0	0	0
150-ACRE CASE	323,925	374,160	424,395	474,629	423,534	447,754	461,457	0	0	0
75-ACRE CASE	323,925	374,160	424,395	416,285	423,534	438,972	472,038	0	0	0
35-ACRE CASE	323,925	300,289	424,395	403,319	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV C										
BASE CASE - 10% ROI	675,656	711,542	680,236	587,926	590,798	34,223	34,223	34,223	34,223	34,223
BASE CASE - 15% ROI	675,656	711,542	680,236	587,926	573,229	34,223	34,223	34,223	34,223	34,223
250-ACRE CASE	675,656	711,542	599,116	587,926	34,223	34,223	34,223	34,223	34,223	34,223
150-ACRE CASE	675,656	711,542	599,116	587,926	34,223	34,223	34,223	34,223	34,223	34,223
75-ACRE CASE	675,656	711,542	599,116	587,926	34,223	34,223	34,223	34,223	34,223	34,223
35-ACRE CASE	675,656	610,306	599,116	570,163	34,223	34,223	34,223	34,223	34,223	34,223

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV E										
BASE CASE - 10% ROI	3,055,270	3,084,117	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070
BASE CASE - 15% ROI	3,055,270	3,084,117	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070
250-ACRE CASE	3,055,270	3,089,002	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070
150-ACRE CASE	3,055,270	3,089,002	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070
75-ACRE CASE	3,055,270	3,089,002	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070
35-ACRE CASE	3,055,270	3,089,979	3,112,963	3,107,471	3,136,002	3,164,533	3,194,070	3,194,070	3,194,070	3,194,070

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	21,530,733	21,835,448	21,669,331	21,550,402	21,846,927	20,397,537	19,737,796	18,842,834	18,764,416	18,701,353
BASE CASE - 15% ROI	21,530,733	21,835,448	21,669,331	21,547,871	21,851,469	19,403,986	19,742,119	18,830,782	18,829,724	18,830,612
250-ACRE CASE	21,530,733	21,594,004	21,512,683	21,502,314	21,741,207	21,775,492	19,708,842	18,834,237	18,834,237	18,705,238
150-ACRE CASE	21,530,733	21,593,990	21,512,683	21,502,314	21,725,959	19,391,344	19,700,787	18,836,945	18,837,703	18,707,946
75-ACRE CASE	21,530,733	21,765,769	21,468,335	21,358,253	21,377,274	19,334,547	19,780,646	18,832,432	18,744,684	16,775,490
35-ACRE CASE	21,530,733	21,413,446	21,478,832	20,370,008	19,297,988	18,765,704	19,188,656	18,419,165	18,419,283	16,444,314

Table E-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	25,261,659	25,631,107	25,462,530	25,245,799	25,573,727	23,596,293	22,966,089	22,071,127	21,992,709	21,929,646
BASE CASE - 15% ROI	25,261,659	25,631,107	25,462,530	25,243,268	25,560,700	22,602,742	22,970,412	22,059,075	22,058,017	22,058,905
250-ACRE CASE	25,261,659	25,394,548	25,224,762	25,197,711	24,911,432	24,974,248	22,937,135	22,062,530	22,062,530	21,933,531
150-ACRE CASE	25,261,659	25,394,534	25,224,762	25,197,711	24,896,184	22,590,100	22,929,080	22,065,238	22,065,996	21,936,239
75-ACRE CASE	25,261,659	25,566,313	25,180,414	25,053,650	24,547,499	22,533,303	23,008,939	22,060,725	21,972,977	20,003,783
35-ACRE CASE	25,261,659	25,113,731	25,190,911	24,047,642	22,468,213	21,964,460	22,416,949	21,647,458	21,647,576	19,672,607

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	2,447,360	2,502,997	2,558,633	2,614,269	2,568,575	2,598,197	2,616,851	2,121,634	2,121,634	2,121,634
BASE CASE - 15% ROI	2,447,360	2,502,997	2,558,633	2,614,269	2,568,575	2,598,197	2,616,851	2,121,634	2,121,634	2,121,634
250-ACRE CASE	2,447,360	2,502,997	2,558,633	2,614,269	2,568,575	2,598,197	2,155,394	2,121,634	2,121,634	2,121,634
150-ACRE CASE	2,447,360	2,502,997	2,558,633	2,614,269	2,568,575	2,598,197	2,616,851	2,121,634	2,121,634	2,121,634
75-ACRE CASE	2,447,360	2,502,997	2,558,633	2,555,925	2,568,575	2,589,415	2,627,432	2,121,634	2,121,634	2,121,634
35-ACRE CASE	2,447,360	2,429,126	2,558,633	2,542,959	2,145,041	2,150,443	2,155,394	2,121,634	2,121,634	2,121,634

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All VA										
BASE CASE - 10% ROI	14339034	14505891	15134866	14777414	15868486	15023574	15363931	16455296	17368707	18552755
BASE CASE - 15% ROI	14339034	14505891	15134866	14778080	14833424	15023532	15472500	16455296	18355939	18294427
250-ACRE CASE	14339034	14516621	14684765	15029789	14835977	15015167	15364766	16458321	18215708	18979464
150-ACRE CASE	14339034	14516621	14684765	14803602	14835977	15027638	15366843	16891178	16761105	18482256
75-ACRE CASE	14339034	14516621	14560432	14861643	14835977	14626314	15745919	16909042	18358965	18979464
35-ACRE CASE	14339034	14675818	14478391	14723506	14444301	14626314	15484538	16458935	17360325	18656337

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Study										
BASE CASE - 10% ROI	42,048,053	42,639,995	43,156,029	42,637,482	44,010,788	41,218,064	40,946,871	40,648,057	41,483,050	42,604,035
BASE CASE - 15% ROI	42,048,053	42,639,995	43,156,029	42,635,617	42,962,699	40,224,471	41,059,763	40,636,005	42,535,590	42,474,966
250-ACRE CASE	42,048,053	42,414,166	42,468,160	42,841,769	42,315,984	42,587,612	40,457,295	40,642,485	42,399,872	43,034,629
150-ACRE CASE	42,048,053	42,414,152	42,468,160	42,615,582	42,300,736	40,215,935	40,912,774	41,078,050	40,948,735	42,540,129
75-ACRE CASE	42,048,053	42,585,931	42,299,479	42,471,218	41,952,051	39,749,032	41,382,290	41,091,401	42,453,576	41,104,881
35-ACRE CASE	42,048,053	42,218,675	42,227,935	41,314,107	39,057,555	38,741,217	40,056,881	40,228,027	41,129,535	40,450,578

Table F-1

Weighted Average Wholesale Electricity Price (Lambda Cost)
(Constant 2001 Dollars per MWHr)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 2										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 3										
BASE CASE - 10% ROI	25.86	18.17	17.68	17.67	18.69	19.14	18.71	20.34	20.78	21.49
BASE CASE - 15% ROI	25.86	18.17	17.68	17.68	18.62	18.59	18.69	20.64	20.82	21.98
250-ACRE CASE	25.86	18.42	17.47	17.60	18.83	18.36	18.86	20.71	20.90	21.73
150-ACRE CASE	25.86	18.42	17.47	17.58	18.81	18.79	18.62	20.59	21.00	21.58
75-ACRE CASE	25.86	18.46	17.47	17.42	18.61	18.58	18.43	20.74	20.84	21.86
35-ACRE CASE	25.86	18.75	17.62	17.73	18.97	18.45	18.54	20.65	20.83	21.72
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
KY 4										
BASE CASE - 10% ROI	24.21	18.17	17.64	17.67	17.65	18.14	17.73	0.00	0.00	0.00
BASE CASE - 15% ROI	24.21	18.17	17.64	17.68	17.61	17.59	17.74	0.00	0.00	0.00
250-ACRE CASE	24.21	18.42	17.43	17.59	17.80	17.39	0.00	0.00	0.00	0.00
150-ACRE CASE	24.21	18.42	17.43	17.58	17.79	17.79	17.69	0.00	0.00	0.00
75-ACRE CASE	24.21	18.46	17.43	17.42	17.67	17.58	17.51	0.00	0.00	0.00
35-ACRE CASE	24.21	18.75	17.61	17.71	0.00	0.00	0.00	0.00	0.00	0.00
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV C										
BASE CASE - 10% ROI	25.87	18.17	17.68	17.67	18.69	19.15	18.71	20.34	20.78	21.49
BASE CASE - 15% ROI	25.87	18.17	17.68	17.68	18.62	18.59	18.69	20.64	20.82	21.98
250-ACRE CASE	25.87	18.42	17.46	17.60	18.83	18.36	18.86	20.71	20.90	21.73
150-ACRE CASE	25.87	18.42	17.46	17.58	18.81	18.79	18.62	20.59	21.00	21.58
75-ACRE CASE	25.87	18.46	17.46	17.42	18.61	18.58	18.43	20.74	20.84	21.86
35-ACRE CASE	25.87	18.75	17.62	17.73	18.97	18.45	18.54	20.65	20.83	21.72
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
WV E										
BASE CASE - 10% ROI	28.40	20.32	20.75	20.19	22.02	21.48	21.48	22.13	22.99	23.05
BASE CASE - 15% ROI	28.40	20.32	20.75	20.19	21.42	21.48	21.52	22.42	22.73	23.08
250-ACRE CASE	28.40	20.32	20.50	20.18	21.43	21.48	21.48	22.61	22.74	23.07
150-ACRE CASE	28.40	20.32	20.50	20.15	21.42	21.48	21.48	22.26	23.02	23.04
75-ACRE CASE	28.40	20.32	20.51	20.21	21.42	21.48	21.48	22.34	22.94	23.07
35-ACRE CASE	28.40	20.46	20.58	20.24	21.58	21.48	21.52	22.53	22.93	23.06

Table F-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	26.79	19.44	18.97	18.98	20.00	19.90	19.75	20.60	21.80	22.52
BASE CASE - 15% ROI	26.79	19.44	18.97	18.99	19.93	19.63	19.73	20.75	21.97	22.94
250-ACRE CASE	26.79	19.70	18.75	18.91	20.14	19.37	19.82	20.83	21.82	22.73
150-ACRE CASE	26.79	19.70	18.75	18.89	20.12	19.75	19.67	20.66	21.90	22.58
75-ACRE CASE	26.79	19.72	18.75	18.72	19.94	19.62	19.53	20.78	21.85	22.98
35-ACRE CASE	26.79	20.02	18.91	19.10	20.45	19.59	19.66	21.79	21.98	22.81

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	26.96	19.51	19.15	19.10	20.22	20.11	19.99	20.82	21.97	22.60
BASE CASE - 15% ROI	26.96	19.51	19.15	19.11	20.08	19.89	19.98	20.99	22.08	22.96
250-ACRE CASE	26.96	19.74	18.94	19.04	20.30	19.64	20.05	21.09	21.95	22.78
150-ACRE CASE	26.96	19.74	18.94	19.01	20.28	19.99	19.92	20.89	22.06	22.65
75-ACRE CASE	26.96	19.76	18.94	18.87	20.13	19.88	19.80	21.01	22.01	22.99
35-ACRE CASE	26.96	20.04	19.09	19.21	20.61	19.86	19.92	21.90	22.12	22.85

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	25.64	18.17	17.67	17.67	18.52	18.97	18.54	20.34	20.78	21.49
BASE CASE - 15% ROI	25.64	18.17	17.67	17.68	18.45	18.42	18.52	20.64	20.82	21.98
250-ACRE CASE	25.64	18.42	17.46	17.60	18.66	18.19	18.86	20.71	20.90	21.73
150-ACRE CASE	25.64	18.42	17.46	17.58	18.64	18.62	18.46	20.59	21.00	21.58
75-ACRE CASE	25.64	18.46	17.46	17.42	18.46	18.41	18.26	20.74	20.84	21.86
35-ACRE CASE	25.64	18.75	17.62	17.73	18.97	18.45	18.54	20.65	20.83	21.72

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All VA										
BASE CASE - 10% ROI	29	20	21	20	22	21	22	22	23	23
BASE CASE - 15% ROI	29	20	21	20	21	21	22	22	23	23
250-ACRE CASE	28.66	20.36	20.39	20.12	21.47	21.41	21.55	22.67	22.82	23.23
150-ACRE CASE	28.66	20.36	20.39	20.1	21.46	21.44	21.49	22.27	22.99	23.14
75-ACRE CASE	28.66	20.37	20.4	20.15	21.44	21.51	21.4	22.37	23.03	23.26
35-ACRE CASE	28.66	20.53	20.5	20.23	21.69	21.5	21.57	22.59	22.97	23.21

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Study Area										
BASE CASE - 10% ROI	27.46	19.71	19.59	19.38	20.76	20.54	20.46	21.35	22.35	22.76
BASE CASE - 15% ROI	27.46	19.71	19.59	19.38	20.45	20.37	20.49	21.58	22.34	23.01
250-ACRE CASE	27.46	19.87	19.35	19.33	20.61	20.17	20.56	21.71	22.27	22.93
150-ACRE CASE	27.46	19.87	19.35	19.30	20.60	20.44	20.42	21.44	22.39	22.81
75-ACRE CASE	27.46	19.89	19.35	19.23	20.49	20.38	20.31	21.55	22.39	23.06
35-ACRE CASE	27.46	20.14	19.48	19.49	20.92	20.40	20.49	22.11	22.41	22.96

Table G-1

Utilities' Environmental Clean-Up Capital Expenditures
(Constant 2001 Dollars)

Region	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 1										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 2										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 3										
BASE CASE - 10% ROI	0	0	0	0	6,720,191	0	0	16,877,843	0	0
BASE CASE - 15% ROI	0	0	0	0	6,720,191	0	0	16,877,843	0	0
250-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
150-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
75-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
35-ACRE CASE	0	0	0	0	6,371,246	0	0	16,877,843	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
KY 4										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV C										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV E										
BASE CASE - 10% ROI	0	0	0	0	7,410,199	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	7,410,199	0	0	0	0	0
250-ACRE CASE	0	0	0	0	7,410,199	0	0	0	0	0
150-ACRE CASE	0	0	0	0	7,410,199	0	0	0	0	0
75-ACRE CASE	0	0	0	0	7,452,999	0	0	0	0	0
35-ACRE CASE	0	0	0	0	7,915,047	0	0	0	0	0

Table G-1 (cont.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV N										
BASE CASE - 10% ROI	209,349	0	0	18,675,821	21,263,721	0	0	43,012,286	0	0
BASE CASE - 15% ROI	209,349	0	0	19,812,967	21,604,468	0	0	43,012,286	0	0
250-ACRE CASE	209,349	0	0	34,476,811	27,818,454	0	0	43,012,286	0	0
150-ACRE CASE	209,349	0	0	33,304,565	27,434,487	0	0	43,012,286	0	0
75-ACRE CASE	209,349	0	0	35,224,441	27,517,336	0	0	43,012,286	0	0
35-ACRE CASE	209,349	0	0	36,333,508	18,898,112	0	0	43,012,286	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV S										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WV SW										
BASE CASE - 10% ROI	0	0	0	0	0	0	0	0	0	0
BASE CASE - 15% ROI	0	0	0	0	0	0	0	0	0	0
250-ACRE CASE	0	0	0	0	0	0	0	0	0	0
150-ACRE CASE	0	0	0	0	0	0	0	0	0	0
75-ACRE CASE	0	0	0	0	0	0	0	0	0	0
35-ACRE CASE	0	0	0	0	0	0	0	0	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All WV										
BASE CASE - 10% ROI	209,349	0	0	18,675,821	28,673,921	0	0	43,012,286	0	0
BASE CASE - 15% ROI	209,349	0	0	19,812,967	29,014,668	0	0	43,012,286	0	0
250-ACRE CASE	209,349	0	0	34,476,811	35,228,653	0	0	43,012,286	0	0
150-ACRE CASE	209,349	0	0	33,304,565	34,844,687	0	0	43,012,286	0	0
75-ACRE CASE	209,349	0	0	35,224,441	34,970,336	0	0	43,012,286	0	0
35-ACRE CASE	209,349	0	0	36,333,508	26,813,158	0	0	43,012,286	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All E. KY										
BASE CASE - 10% ROI	0	0	0	0	6,720,191	0	0	16,877,843	0	0
BASE CASE - 15% ROI	0	0	0	0	6,720,191	0	0	16,877,843	0	0
250-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
150-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
75-ACRE CASE	0	0	0	0	6,720,191	0	0	16,877,843	0	0
35-ACRE CASE	0	0	0	0	6,371,246	0	0	16,877,843	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VA										
BASE CASE - 10% ROI	0	0	0	0	5,784,523	0	0	28,658,885	0	0
BASE CASE - 15% ROI	0	0	0	0	5,458,247	110,240	3,594	11,802,724	0	0
250-ACRE CASE	0	0	0	0	5,581,295	0	111,617	28,658,885	0	0
150-ACRE CASE	0	0	0	0	5,581,295	0	111,617	15,501,091	0	0
75-ACRE CASE	0	0	0	0	5,354,984	110,134	3,594	29,000,638	0	0
35-ACRE CASE	0	0	0	121,153	4,563,160	7,455	0	21,586,819	0	0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Regions										
BASE CASE - 10% ROI	209,349	0	0	18,675,821	41,178,634	0	0	88,549,014	0	0
BASE CASE - 15% ROI	209,349	0	0	19,812,967	41,193,105	110,240	3,594	71,692,853	0	0
250-ACRE CASE	209,349	0	0	34,476,811	47,530,138	0	111,617	88,549,014	0	0
150-ACRE CASE	209,349	0	0	33,304,565	47,146,172	0	111,617	75,391,220	0	0
75-ACRE CASE	209,349	0	0	35,224,441	47,045,510	110,134	3,594	88,890,767	0	0
35-ACRE CASE	209,349	0	0	36,454,660	37,747,564	7,455	0	81,476,948	0	0

Table H-1

Electricity Capacity Capital Investments by Type
(Constant 2001 Dollars)

		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010	
		MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $	MW Added	Capital $
BASE CASE - 10% ROI																					
VA	CC	0	0	0	0	288	115,392,000	365	146,052,000	364	145,548,000	384	153,592,000	394	157,736,000	591	236,376,000	0	0	561	224,284,000
VA	GT	0	0	1,183	295,707,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0
BASE CASE - 15% ROI																					
VA	CC	0	0	0	0	288	115,392,000	365	146,052,000	364	145,548,000	384	153,592,000	394	157,736,000	541	216,376,000	0	0	561	224,284,000
VA	GT	0	0	1,182	295,457,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0
250-ACRE																					
VA	CC	0	0	0	0	291	116,512,000	365	145,992,000	364	145,552,000	384	153,592,000	394	157,736,000	541	216,376,000	0	0	561	224,284,000
VA	GT	0	0	1,179	294,792,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0
150-ACRE																					
VA	CC	0	0	0	0	291	116,512,000	365	145,992,000	364	145,552,000	384	153,592,000	394	157,736,000	541	216,376,000	0	0	561	224,284,000
VA	GT	0	0	1,179	294,792,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0
75-ACRE																					
VA	CC	0	0	0	0	291	116,512,000	365	145,992,000	364	145,552,000	384	153,592,000	393	157,336,000	541	216,376,000	0	0	561	224,284,000
VA	GT	0	0	1,179	294,792,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0
35-ACRE																					
VA	CC	0	0	0	0	292	116,736,000	365	145,984,000	364	145,552,000	384	153,592,000	394	157,736,000	530	212,148,000	0	0	564	225,796,000
VA	GT	0	0	1,179	294,657,500	0	0	0	0	0	0	0	0	0	0	0	0	7	1,745,000	0	0
VA	COAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520	728,000,000	0	0

Table I-1

Major Coal Mine Direct Operating Costs by Category For Entire Study Area

	Deep Mines $/Ton	Surface Mines $/Ton
Labor	$6.24	$4.30
Materials/Supply	$3.79	$8.36
Trucking	$1.12	$1.58
Coal Washing	$2.90	$0.40

Table J-1

Average U.S. Wholesale Electricity Price (Lambda Cost)
(Constant 2001 Dollars per MWHr)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Base - 10% ROI	37.25	22.54	22.44	22.32	23.11	22.22	22.32	23.15	23.51	24.00
Base - 15% ROI	37.25	22.54	22.44	22.32	23.06	22.19	22.33	23.30	23.65	24.12
250-Acre	37.25	22.63	22.33	22.24	23.09	22.12	22.36	23.40	23.66	24.12
150-Acre	37.25	22.63	22.33	22.25	23.10	22.19	22.28	23.34	23.64	24.06
75-Acre	37.25	22.64	22.34	22.26	23.07	22.17	22.12	23.41	23.64	24.12
35-Acre	37.25	22.78	22.40	22.27	23.27	22.20	22.30	23.36	23.58	24.15